SEQUENCE LISTING

<110> Zur Megede, Jan
      Barnett, Susan W.
      Engelbrecht, Susan
      van Rensburg, Estrelita Janse

<120> Polynucleotides Encoding Antigenic HIV Type C Polypeptides,
      Polypeptides and Uses Thereof

<130> PP01631.102

<140> 09/899,575
<141> 2001-07-05

<150> 09/610,313
<151> 2000-07-05

<160> 147

<170> PatentIn version 3.4

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<212> DNA
<213> Human immunodeficiency virus

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atccgccagc tgcacccccgc cctgcagacc ggcagcgagg agctgaagag cctgttcaac   240

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gacctgaaca cgatgttgaa caccgtgggc ggccaccagg ccgccatgca gatgctgaag   600

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cccggcaact tcctgcagaa ccgcagcgag cccgccgccc ccaccgtgcc caccgccccc   1380

cccgccgaga gcttccgctt cgaggagacc accccgcccc caagcagga gcccaaggac     1440

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<220>
<223>   Env common region of HIV strain AF110968

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ctgctgaccc gcgacggcgg c                                               141


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<212>  DNA
<213>  Artificial

<220>
<223>  synthetic gp120 coding region of HIV strain AF110968

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tgggccaccc acgcctgcgt gcccaccgac cccaacccccc aggagatcgt gctggagaac      180

gtgaccgaga acttcaacat gtggaagaac gacatggtgg accagatgca cgaggacatc      240

atcagcctgt gggaccagag cctgaagccc tgcgtgaagc tgacccccct gtgcgtgacc      300

ctgaagtgcc gcaacgtgaa cgccaccaac aacatcaaca gcatgatcga acacagcaac      360

aagggcgaga tgaagaactg cagcttcaac gtgaccaccg agctgcgcga ccgcaagcag      420

gaggtgcacg ccctgttcta ccgcctggac gtggtgcccc tgcagggcaa caacagcaac      480

gagtaccgcc tgatcaactg caacaccagc gccatcaccc aggcctgccc caaggtgagc      540

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aaccagacct tcaacggcac cggcccctgc aacaacgtga gcagcgtgca gtgcgcccac      660

ggcatcaagc ccgtggtgag cacccagctg ctgctgaacg gcagcctggc caagggcgag      720

atcatcatcc gcagcgagaa cctggccaac aacgccaaga tcatcatcgt gcagctgaac      780

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gagcacttca gcaagaaggc catcaagttc gagcccagca gcggcggcga cctggagatc      1020

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aacagcacct acagcccccag cttcaacggc accgagaaca agctgaacgg caccatcacc      1140

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gcccccccca tcgccggcaa cctgacctgc gagagcaaca tcaccggcct gctgctgacc      1260
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4

cgcgacggcg gcaagaccgg ccccaacgac accgagatct tccgccccgg cggcggcgac   1320

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<212>   DNA
<213>   Artificial

<220>
<223>   synthetic gp140 coding region of HIV strain AF110968

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tgggccaccc acgcctgcgt gcccaccgac cccaacccccc aggagatcgt gctggagaac   180

gtgaccgaga acttcaacat gtggaagaac gacatggtgg accagatgca cgaggacatc   240

atcagcctgt gggaccagag cctgaagccc tgcgtgaagc tgaccccccct gtgcgtgacc   300

ctgaagtgcc gcaacgtgaa cgccaccaac aacatcaaca gcatgatcga acagcaac   360

aagggcgaga tgaagaactg cagcttcaac gtgaccaccg agctgcgcga ccgcaagcag   420

gaggtgcacg ccctgttcta ccgcctggac gtggtgcccc tgcagggcaa caacagcaac   480

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ttcgacccca tccccatcca ctactgcacc cccgccggct acgccatcct gaagtgcaac   600

aaccagacct tcaacggcac cggcccctgc aacaacgtga gcagcgtgca gtgcgcccac   660

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gagcacttca gcaagaaggc catcaagttc gagcccagca gcggcggcga cctggagatc   1020

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atcggcgccg tgttcctggg cttcctgggc gccgccggca gcaccatggg cgccgccagc   1500

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atcaacaact acaccgacac catctaccgc ctgctggagg agagccagaa ccagcaggag   1860

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tgggccaccc acgcctgcgt gcccaccgac cccaacccc aggagatcgt gctggagaac    180

gtgaccgaga acttcaacat gtggaagaac gacatggtgg accagatgca cgaggacatc    240

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7

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       AF110968

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8

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aagctgaacg gcaccatcac catcacctgc cgcatcaagc agatcatcaa catgtggcag    1260

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cgcgagaagc gcgccgtggg catcggcgcc gtgttcctgg gcttcctggg cgccgccggc    1560

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<211> 1035
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<220>
<223> synthetic a gp41 coding region of HIV strain AF110968

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9

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ctgatcggcc tgcgcatcat cttcgccgtg ctgagcatcg tgaaccgcgt gcgccagggc      600

tacagccccc tgcccttcca gaccctgacc cccaacccc gcgagcccga ccgcctgggc      660

cgcatcgagg aggagggcgg cgagcaggac cgcggccgca gcatccgcct ggtgagcggc      720

ttcctggccc tggcctggga cgacctgcgc agcctgtgcc tgttcagcta ccaccgcctg      780

cgcgacttca tcctgatcgc cgcccgcgtg ctggagctgc tgggccagcg cggctgggag      840

gccctgaagt acctgggcag cctggtgcag tactggggcc tggagctgaa gaagagcgcc      900

atcagcctgc tggacaccat cgccatcgcc gtggccgagg gcaccgaccg catcatcgag      960

ttcatccagc gcatctgccg cgccatccgc aacatccccc gccgcatccg ccagggcttc     1020

gaggccgccc tgcag                                                      1035


<210> 11
<211> 144
<212> DNA
<213> Artificial

<220>
<223> synthetic Env common region of HIV strain AF110975

<400> 11
agcatcatca ccctgccctg ccgcatcaag cagatcatcg acatgtggca gaaggtgggc       60

cgcgccatct acgcccccc catcgagggc aacatcacct gcagcagcag catcaccggc      120

ctgctgctgg cccgcgacgg cggc                                            144


<210> 12
<211> 1437
<212> DNA
<213> Artificial
```

10

<220>
<223>   synthetic gp120 coding region of HIV strain AF110975

<400>   12
agcggcctgg gcaacctgtg ggtgaccgtg tacgacggcg tgcccgtgtg gcgcgaggcc   60

agcaccaccc tgttctgcgc cagcgacgcc aaggcctacg agaaggaggt gcacaacgtg   120

tgggccaccc acgcctgcgt gcccaccgac cccaaccccc aggagatcga gctggacaac   180

gtgaccgaga acttcaacat gtggaagaac gacatggtgg accagatgca cgaggacatc   240

atcagcctgt gggaccagag cctgaagccc cgcgtgaagc tgacccccct gtgcgtgacc   300

ctgaagtgca ccaactacag caccaactac agcaacacca tgaacgccac cagctacaac   360

aacaacacca ccgaggagat caagaactgc accttcaaca tgaccaccga gctgcgcgac   420

aagaagcagc aggtgtacgc cctgttctac aagctggaca tcgtgcccct gaacagcaac   480

agcagcgagt accgcctgat caactgcaac accagcgcca tcacccaggc ctgccccaag   540

gtgagcttcg accccatccc catccactac tgcgcccccg ccggctacgc catcctgaag   600

tgcaagaaca acaccagcaa cggcaccggc ccctgccaga cgtgagcac cgtgcagtgc   660

acccacggca tcaagcccgt ggtgagcacc cccctgctgc tgaacggcag cctggccgag   720

ggcggcgaga tcatcatccg cagcaagaac ctgagcaaca cgcctacac catcatcgtg   780

cacctgaacg acagcgtgga gatcgtgtgc acccgcccca caacaacac ccgcaagggc   840

atccgcatcg gccccggcca gaccttctac gccaccgaga acatcatcgg cgacatccgc   900

caggcccact gcaacatcag cgccggcgag tggaacaagg ccgtgcagcg cgtgagcgcc   960

aagctgcgcg agcacttccc caacaagacc atcgagttcc agcccagcag cggcggcgac   1020

ctggagatca ccacccacag cttcaactgc cgcggcgagt cttctactg caacaccagc   1080

aagctgttca acagcagcta caacggcacc agctaccgcg gcaccgagag caacagcagc   1140

atcatcaccc tgccctgccg catcaagcag atcatcgaca tgtggcagaa ggtgggccgc   1200

gccatctacg cccccccat cgagggcaac atcacctgca gcagcagcat caccggcctg   1260

ctgctggccc gcgacggcgg cctggacaac atcaccaccg agatcttccg cccccagggc   1320

ggcgacatga aggacaactg cgcgaacgag ctgtacaagt acaaggtggt ggagatcaag   1380

cccctgggcg tggcccccac cgaggccaag cgccgcgtgg tggagcgcga gaagcgc   1437

<210>   13
<211>   1950
<212>   DNA
<213>   Artificial

11

<220>
<223> synthetic gp140 coding region of HIV strain AF110975

<400> 13

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agcggcctgg gcaacctgtg ggtgaccgtg tacgacggcg tgcccgtgtg gcgcgaggcc     60

agcaccaccc tgttctgcgc cagcgacgcc aaggcctacg agaaggaggt cacaacgtg     120

tgggccaccc acgcctgcgt gcccaccgac cccaaccccc aggagatcga gctggacaac     180

gtgaccgaga acttcaacat gtggaagaac gacatggtgg accagatgca cgaggacatc     240

atcagcctgt gggaccagag cctgaagccc cgcgtgaagc tgacccccct gtgcgtgacc     300

ctgaagtgca ccaactacag caccaactac agcaacacca tgaacgccac cagctacaac     360

aacaacacca ccgaggagat caagaactgc accttcaaca tgaccaccga gctgcgcgac     420

aagaagcagc aggtgtacgc cctgttctac aagctggaca tcgtgcccct gaacagcaac     480

agcagcgagt accgcctgat caactgcaac accagcgcca tcacccaggc ctgccccaag     540

gtgagcttcg accccatccc catccactac tgcgcccccg ccggctacgc catcctgaag     600

tgcaagaaca acaccagcaa cggcaccggc ccctgccaga cgtgagcac cgtgcagtgc     660

acccacggca tcaagcccgt ggtgagcacc cccctgctgc tgaacggcag cctggccgag     720

ggcggcgaga tcatcatccg cagcaagaac ctgagcaaca cgcctacac catcatcgtg     780

cacctgaacg acagcgtgga gatcgtgtgc acccgcccca caacaacac ccgcaagggc     840

atccgcatcg ccccggcca gaccttctac gccaccgaga acatcatcgg cgacatccgc     900

caggcccact gcaacatcag cgccggcgag tggaacaagg ccgtgcagcg cgtgagcgcc     960

aagctgcgcg agcacttccc caacaagacc atcgagttcc agcccagcag cggcggcgac    1020

ctggagatca ccacccacag cttcaactgc cgcggcgagt cttctactg caacaccagc    1080

aagctgttca acagcagcta caacggcacc agctaccgcg gcaccgagag caacagcagc    1140

atcatcaccc tgccctgccg catcaagcag atcatcgaca tgtggcagaa ggtgggccgc    1200

gccatctacg cccccccat cgagggcaac atcacctgca gcagcagcat caccggcctg    1260

ctgctggccc gcgacggcgg cctggacaac atcaccaccg agatcttccg cccccagggc    1320

ggcgacatga aggacaactg cgcgaacgag ctgtacaagt acaaggtggt ggagatcaag    1380

cccctgggcg tggccccac cgaggccaag cgccgcgtgg tggagcgcga agcgcgcc     1440

gtgggcatcg cgccgtgat cttcggcttc ctgggcgccg ccggcagcaa catgggcgcc    1500

gccagcatca ccctgaccgc ccaggcccgc cagctgctga cggcatcgt gcagcagcag    1560
```

12

```
agcaacctgc tgcgcgccat cgaggcccag cagcacatgc tgcagctgac cgtgtggggc    1620

atcaagcagc tgcaggcccg cgtgctggcc atcgagcgct acctgaagga ccagcagctg    1680

ctgggcatct ggggctgcag cggcaagctg atctgcacca ccaccgtgcc ctggaacagc    1740

agctggagca acaagaccca gggcgagatc tgggagaaca tgacctggat gcagtgggac    1800

aaggagatca gcaactacac cggcatcatc taccgcctgc tggaggagag ccagaaccag    1860

caggagcaga cgagaagga cctgctggcc ctggacagcc gcaacaacct gtggagctgg    1920

ttcaacatca gcaactggct gtggtacatc                                     1950


<210>   14
<211>   2493
<212>   DNA
<213>   Artificial

<220>
<223>   synthetic gp160 coding region of HIV strain AF110975

<400>   14
agcggcctgg gcaacctgtg ggtgaccgtg tacgacggcg tgcccgtgtg cgcgcgaggcc     60

agcaccaccc tgttctgcgc cagcgacgcc aaggcctacg agaaggaggt gcacaacgtg    120

tgggccaccc acgcctgcgt gcccaccgac cccaaccccc aggagatcga gctggacaac    180

gtgaccgaga acttcaacat gtggaagaac gacatggtgg accagatgca cgaggacatc    240

atcagcctgt gggaccagag cctgaagccc cgcgtgaagc tgaccccccc tgtgcgtgacc    300

ctgaagtgca ccaactacag caccaactac agcaacacca tgaacgccac cagctacaac    360

aacaacacca ccgaggagat caagaactgc accttcaaca tgaccaccga gctgcgcgac    420

aagaagcagc aggtgtacgc cctgttctac aagctggaca tcgtgccct gaacagcaac    480

agcagcgagt accgcctgat caactgcaac accagcgcca tcacccaggc ctgccccaag    540

gtgagcttcg accccatccc catccactac tgcgcccccg ccggctacgc catcctgaag    600

tgcaagaaca acaccagcaa cggcaccggc ccctgccaga cgtgagcac cgtgcagtgc    660

acccacggca tcaagcccgt ggtgagcacc cccctgctgc tgaacggcag cctggccgag    720

ggcggcgaga tcatcatccg cagcaagaac ctgagcaaca cgcctacac catcatcgtg    780

cacctgaacg acagcgtgga gatcgtgtgc acccgcccca caacaacac ccgcaagggc    840

atccgcatcg gccccggcca gaccttctac gccaccgaga acatcatcgg cgacatccgc    900

caggcccact gcaacatcag cgccggcgag tggaacaagg ccgtgcagcg cgtgagcgcc    960

aagctgcgcg agcacttccc caacaagacc atcgagttcc agcccagcag cggcggcgac   1020
```

13

ctggagatca ccacccacag cttcaactgc cgcggcgagt tcttctactg caacaccagc   1080

aagctgttca acagcagcta caacggcacc agctaccgcg gcaccgagag caacagcagc   1140

atcatcaccc tgccctgccg catcaagcag atcatcgaca tgtggcagaa ggtgggccgc   1200

gccatctacg ccccccccat cgagggcaac atcacctgca gcagcagcat caccggcctg   1260

ctgctggccc gcgacggcgg cctggacaac atcaccaccg agatcttccg cccccagggc   1320

ggcgacatga aggacaactg gcgcaacgag ctgtacaagt acaaggtggt ggagatcaag   1380

cccctgggcg tggcccccac cgaggccaag cgccgcgtgg tggagcgcga gaagcgcgcc   1440

gtgggcatcg cgccgtgat cttcggcttc ctgggcgccg ccggcagcaa catgggcgcc   1500

gccagcatca ccctgaccgc ccaggcccgc cagctgctga gcggcatcgt gcagcagcag   1560

agcaacctgc tgcgcgccat cgaggcccag cagcacatgc tgcagctgac cgtgtggggc   1620

atcaagcagc tgcaggcccg cgtgctggcc atcgagcgct acctgaagga ccagcagctg   1680

ctgggcatct ggggctgcag cggcaagctg atctgcacca ccaccgtgcc ctggaacagc   1740

agctggagca acaagaccca gggcgagatc tgggagaaca tgacctggat gcagtgggac   1800

aaggagatca gcaactacac cggcatcatc taccgcctgc tggaggagag ccagaaccag   1860

caggagcaga acgagaagga cctgctggcc ctggacagcc gcaacaacct gtggagctgg   1920

ttcaacatca gcaactggct gtggtacatc aagatcttca tcatgatcgt gggcggcctg   1980

atcggcctgc gcatcatctt cgccgtgctg agcatcgtga ccgcgtgcg ccagggctac   2040

agcccccctga gcttccagac cctgacccc aacccccgcg gcctggaccg cctgggccgc   2100

atcgaggagg agggcggcga gcaggaccgc gaccgcagca tccgcctggt gcagggcttc   2160

ctggcccctgg cctgggacga cctgcgcagc ctgtgcctgt tcagctacca ccgcctgcgc   2220

gacctgatcc tggtgaccgc ccgcgtggtg gagctgctgg ccgcagcag cccccgcggc   2280

ctgcagcgcg gctgggaggc cctgaagtac ctgggcagcc tggtgcagta ctggggcctg   2340

gagctgaaga gagcgccac cagcctgctg gacagcatcg ccatcgccgt ggccgagggc   2400

accgaccgca tcatcgaggt gatccagcgc atctaccgcg ccttctgcaa catcccccgc   2460

cgcgtgcgcc agggcttcga ggccgccctg cag   2493

14

<220>
<223> synthetic signal sequence and gp160 coding region of HIV strain
      AF110975

<400>   15
atgcgcgtgc gcggcatcct gcgcagctgg cagcagtggt ggatctgggg catcctgggc   60

ttctggatct gcagcggcct gggcaacctg tgggtgaccg tgtacgacgg cgtgcccgtg   120

tggcgcgagg ccagcaccac cctgttctgc gccagcgacg ccaaggccta cgagaaggag   180

gtgcacaacg tgtgggccac ccacgcctgc gtgcccaccg accccaaccc caggagatc   240

gagctggaca cgtgaccga gaacttcaac atgtggaaga cgacatggt ggaccagatg   300

cacgaggaca tcatcagcct gtgggaccag agcctgaagc cccgcgtgaa gctgacccccc   360

ctgtgcgtga ccctgaagtg caccaactac agcaccaact acagcaacac catgaacgcc   420

accagctaca caacaacac caccgaggag atcaagaact gcaccttcaa catgaccacc   480

gagctgcgcg acaagaagca gcaggtgtac gccctgttct acaagctgga catcgtgccc   540

ctgaacagca acagcagcga gtaccgcctg atcaactgca acaccagcgc catcacccag   600

gcctgcccca aggtgagctt cgaccccatc cccatccact actgcgcccc cgccggctac   660

gccatcctga gtgcaagaa caacaccagc aacggcaccg cccctgcca gaacgtgagc   720

accgtgcagt gcacccacgg catcaagccc gtggtgagca cccccctgct gctgaacggc   780

agcctggccg agggcggcga gatcatcatc cgcagcaaga acctgagcaa caacgcctac   840

accatcatcg tgcacctgaa cgacagcgtg gagatcgtgt gcacccgccc caacaacaac   900

acccgcaagg gcatccgcat cggcccccggc cagaccttct acgccaccga gaacatcatc   960

ggcgacatcc gccaggccca ctgcaacatc agcgccggcg agtggaacaa ggccgtgcag   1020

cgcgtgagcg ccaagctgcg cgagcacttc cccaacaaga ccatcgagtt ccagcccagc   1080

agcggcggcg acctggagat caccacccac agcttcaact gccgcggcga gttcttctac   1140

tgcaacacca gcaagctgtt caacagcagc tacaacggca ccagctaccg cggcaccgag   1200

agcaacagca gcatcatcac cctgcccctgc cgcatcaagc agatcatcga catgtggcag   1260

aaggtgggcc gcgccatcta cgccccccccc atcgagggca acatcacctg cagcagcagc   1320

atcaccggcc tgctgctggc ccgcgacggc ggcctggaca acatcaccac cgagatcttc   1380

cgcccccagg cggcgacat gaaggacaac tggcgcaacg agctgtacaa gtacaaggtg   1440

gtggagatca gcccctgggg cgtggccccc accgaggcca gcgccgcgt ggtggagcgc   1500

gagaagcgcg ccgtgggcat cggcgccgtg atcttcggct tcctgggcgc cgccggcagc   1560

15

```
aacatgggcg ccgccagcat caccctgacc gcccaggccc gccagctgct gagcggcatc   1620

gtgcagcagc agagcaacct gctgcgcgcc atcgaggccc agcagcacat gctgcagctg   1680

accgtgtggg gcatcaagca gctgcaggcc cgcgtgctgg ccatcgagcg ctacctgaag   1740

gaccagcagc tgctgggcat ctggggctgc agcggcaagc tgatctgcac caccaccgtg   1800

ccctggaaca gcagctggag caacaagacc cagggcgaga tctgggagaa catgacctgg   1860

atgcagtggg acaaggagat cagcaactac accggcatca tctaccgcct gctggaggag   1920

agccagaacc agcaggagca gaacgagaag gacctgctgg ccctggacag ccgcaacaac   1980

ctgtggagct ggttcaacat cagcaactgg ctgtggtaca tcaagatctt catcatgatc   2040

gtgggcggcc tgatcggcct gcgcatcatc ttcgccgtgc tgagcatcgt gaaccgcgtg   2100

cgccagggct acagccccct gagcttccag accctgaccc ccaacccccg cggcctggac   2160

cgcctgggcc gcatcgagga ggagggcggc gagcaggacc gcgaccgcag catccgcctg   2220

gtgcagggct cctggcccct ggcctgggac gacctgcgca gcctgtgcct gttcagctac   2280

caccgcctgc gcgacctgat cctggtgacc gcccgcgtgg tggagctgct gggccgcagc   2340

agcccccgcg gcctgcagcg cggctgggag gccctgaagt acctgggcag cctggtgcag   2400

tactggggcc tggagctgaa gaagagcgcc accagcctgc tggacagcat cgccatcgcc   2460

gtggccgagg gcaccgaccg catcatcgag gtgatccagc gcatctaccg cgccttctgc   2520

aacatccccc gccgcgtgcg ccagggcttc gaggccgccc tgcag   2565
```

```
gccgtgggca tcggcgccgt gatcttcggc ttcctgggcg ccgccggcag caacatgggc     60

gccgccagca tcaccctgac cgcccaggcc cgccagctgc tgagcggcat cgtgcagcag    120

cagagcaacc tgctgcgcgc catcgaggcc agcagcaca tgctgcagct gaccgtgtgg    180

ggcatcaagc agctgcaggc ccgcgtgctg gccatcgagc gctacctgaa ggaccagcag    240

ctgctgggca tctggggctg cagcggcaag ctgatctgca ccaccaccgt gccctggaac    300

agcagctgga gcaacaagac ccagggcgag atctgggaga acatgacctg gatgcagtgg    360

gacaaggaga tcagcaacta caccggcatc atctaccgcc tgctggagga gagccagaac    420
```

16

```
cagcaggagc agaacgagaa ggacctgctg gccctggaca gccgcaacaa cctgtggagc      480

tggttcaaca tcagcaactg gctgtggtac atcaagatct tcatcatgat cgtgggcggc      540

ctgatcggcc tgcgcatcat cttcgccgtg ctgagcatcg tgaaccgcgt gcgccagggc      600

tacagccccc tgagcttcca gaccctgacc cccaacccccc gcggcctgga ccgcctgggc      660

cgcatcgagg aggagggcgg cgagcaggac cgcgaccgca gcatccgcct ggtgcagggc      720

ttcctggccc tggcctggga cgacctgcgc agcctgtgcc tgttcagcta ccaccgcctg      780

cgcgacctga tcctggtgac cgcccgcgtg gtggagctgc tgggccgcag cagcccccgc      840

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ctggagctga agaagagcgc caccagcctg ctggacagca tcgccatcgc cgtggccgag      960

ggcaccgacc gcatcatcga ggtgatccag cgcatctacc gcgccttctg caacatcccc     1020

cgccgcgtgc gccagggctt cgaggccgcc ctgcag                                1056


<210>   17
<211>   492
<212>   PRT
<213>   Human immunodeficiency virus

<400>   17

Met Gly Ala Arg Ala Ser Ile Leu Arg Gly Gly Lys Leu Asp Ala Trp
1               5                   10                  15


Glu Arg Ile Arg Leu Arg Pro Gly Gly Lys Lys Cys Tyr Met Met Lys
            20                  25                  30


His Leu Val Trp Ala Ser Arg Glu Leu Glu Lys Phe Ala Leu Asn Pro
        35                  40                  45


Gly Leu Leu Glu Thr Ser Glu Gly Cys Lys Gln Ile Ile Arg Gln Leu
    50                  55                  60


His Pro Ala Leu Gln Thr Gly Ser Glu Glu Leu Lys Ser Leu Phe Asn
65                  70                  75                  80


Thr Val Ala Thr Leu Tyr Cys Val His Glu Lys Ile Glu Val Arg Asp
                85                  90                  95


Thr Lys Glu Ala Leu Asp Lys Ile Glu Glu Glu Gln Asn Lys Cys Gln
            100                 105                 110
```

17

```
Gln Lys Ile Gln Gln Ala Glu Ala Ala Asp Lys Gly Lys Val Ser Gln
    115                 120                 125

Asn Tyr Pro Ile Val Gln Asn Leu Gln Gly Gln Met Val His Gln Ala
    130                 135                 140

Ile Ser Pro Arg Thr Leu Asn Ala Trp Val Lys Val Ile Glu Glu Lys
145                 150                 155                 160

Ala Phe Ser Pro Glu Val Ile Pro Met Phe Thr Ala Leu Ser Glu Gly
                165                 170                 175

Ala Thr Pro Gln Asp Leu Asn Thr Met Leu Asn Thr Val Gly Gly His
                180                 185                 190

Gln Ala Ala Met Gln Met Leu Lys Asp Thr Ile Asn Glu Glu Ala Ala
        195                 200                 205

Glu Trp Asp Arg Val His Pro Val His Ala Gly Pro Ile Ala Pro Gly
    210                 215                 220

Gln Met Arg Glu Pro Arg Gly Ser Asp Ile Ala Gly Thr Thr Ser Thr
225                 230                 235                 240

Leu Gln Glu Gln Ile Ala Trp Met Thr Ser Asn Pro Pro Ile Pro Val
                245                 250                 255

Gly Asp Ile Tyr Lys Arg Trp Ile Ile Leu Gly Leu Asn Lys Ile Val
                260                 265                 270

Arg Met Tyr Ser Pro Val Ser Ile Leu Asp Ile Lys Gln Gly Pro Lys
        275                 280                 285

Glu Pro Phe Arg Asp Tyr Val Asp Arg Phe Phe Lys Thr Leu Arg Ala
    290                 295                 300

Glu Gln Ser Thr Gln Glu Val Lys Asn Trp Met Thr Asp Thr Leu Leu
305                 310                 315                 320

Val Gln Asn Ala Asn Pro Asp Cys Lys Thr Ile Leu Arg Ala Leu Gly
                325                 330                 335
```

18

Pro Gly Ala Ser Leu Glu Glu Met Met Thr Ala Cys Gln Gly Val Gly
          340   345   350

Gly Pro Ser His Lys Ala Arg Val Leu Ala Glu Ala Met Ser Gln Ala
          355   360   365

Asn Thr Ser Val Met Met Gln Lys Ser Asn Phe Lys Gly Pro Arg Arg
     370   375   380

Ile Val Lys Cys Phe Asn Cys Gly Lys Glu Gly His Ile Ala Arg Asn
385   390   395   400

Cys Arg Ala Pro Arg Lys Lys Gly Cys Trp Lys Cys Gly Lys Glu Gly
               405   410   415

His Gln Met Lys Asp Cys Thr Glu Arg Gln Ala Asn Phe Leu Gly Lys
          420   425   430

Ile Trp Pro Ser His Lys Gly Arg Pro Gly Asn Phe Leu Gln Ser Arg
          435   440   445

Pro Glu Pro Thr Ala Pro Pro Ala Glu Ser Phe Arg Phe Glu Glu Thr
     450   455   460

Thr Pro Gly Gln Lys Gln Glu Ser Lys Asp Arg Glu Thr Leu Thr Ser
465   470   475   480

Leu Lys Ser Leu Phe Gly Asn Asp Pro Leu Ser Gln
               485   490

<210> 18
<211> 81
<212> DNA
<213> Artificial

<220>
<223> synthetic signal sequence of HIV strain AF110968

<400> 18
atgcgcgtga tgggcatcct gaagaactac cagcagtggt ggatgtgggg catcctgggc   60

ttctggatgc tgatcatcag c   81

<210> 19
<211> 72

19

<212> DNA
<213> Artificial

<220>
<223> synthetic signal sequence of HIV strain AF110975

<400> 19
atgcgcgtgc gcggcatcct gcgcagctgg cagcagtggt ggatctgggg catcctgggc   60

ttctggatct gc   72

<210> 20
<211> 1479
<212> DNA
<213> Artificial

<220>
<223> synthetic Gag coding sequence of HIV strain AF110965

<400> 20
atgggcgccc gcgccagcat cctgcgcggc ggcaagctgg acgcctggga gcgcatccgc   60

ctgcgccccg gcggcaagaa gtgctacatg atgaagcacc tggtgtgggc cagccgcgag   120

ctggagaagt tcgccctgaa ccccggcctg ctggagacca gcgagggctg caagcagatc   180

atccgccagc tgcaccccgc cctgcagacc ggcagcgagg agctgaagag cctgttcaac   240

accgtggcca ccctgtactg cgtgcacgag aagatcgagg tgcgcgacac caaggaggcc   300

ctggacaaga tcgaggagga gcagaacaag tgccagcaga gatccagca ggccgaggcc   360

gccgacaagg caaggtgag ccagaactac cccatcgtgc agaacctgca gggccagatg   420

gtgcaccagg ccatcagccc ccgcaccctg aacgcctggg tgaaggtgat cgaggagaag   480

gccttcagcc ccgaggtgat ccccatgttc accgccctga gcgagggcgc cacccccag   540

gacctgaaca ccatgctgaa caccgtgggc ggccaccagg ccgccatgca gatgctgaag   600

gacaccatca cgaggaggc cgccgagtgg accgcgtgc accccgtgca cgccggcccc   660

atcgccccg gccagatgcg cgagccccgc ggcagcgaca tcgccggcac caccagcacc   720

ctgcaggagc agatcgcctg gatgaccagc aacccccca tccccgtggg cgacatctac   780

aagcgctgga tcatcctggg cctgaacaag atcgtgcgca tgtacagccc cgtgagcatc   840

ctggacatca gcagggccc caaggagccc ttccgcgact acgtggaccg cttcttcaag   900

accctgcgcg ccgagcagag cacccaggag gtgaagaact ggatgaccga caccctgctg   960

gtgcagaacg ccaaccccga ctgcaagacc atcctgcgcg ccctgggccc cggcgccagc   1020

ctggaggaga tgatgaccgc ctgccagggc gtgggcggcc ccagccacaa ggcccgcgtg   1080

20

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ctggccgagg ccatgagcca ggccaacacc agcgtgatga tgcagaagag caacttcaag    1140

ggcccccgcc gcatcgtgaa gtgcttcaac tgcggcaagg agggccacat cgcccgcaac    1200

tgccgcgccc cccgcaagaa gggctgctgg aagtgcggca aggagggcca ccagatgaag    1260

gactgcaccg agcgccaggc caacttcctg ggcaagatct ggcccagcca caagggccgc    1320

cccggcaact tcctgcagag ccgcccccgag cccaccgccc cccccgccga gcttccgc    1380

ttcgaggaga ccaccccccgg ccagaagcag gagagcaagg accgcgagac cctgaccagc    1440

ctgaagagcc tgttcggcaa cgaccccctg agccagtaa                           1479


<210>  21
<211>  1509
<212>  DNA
<213>  Artificial

<220>
<223>  synthetic Gag coding sequence of HIV strain AF110967

<400>  21
atgggcgccc cgcgccagcat cctgcgcggc gagaagctgg acaagtggga gaagatccgc      60

ctgcgccccg gcggcaagaa gcactacatg ctgaagcacc tggtgtgggc cagccgcgag     120

ctggagggct cgccctgaa ccccggcctg ctggagaccg ccgagggctg caagcagatc     180

atgaagcagc tgcagcccgc cctgcagacc ggcaccgagg agctgcgcag cctgtacaac     240

accgtggcca ccctgtactg cgtgcacgcc ggcatcgagg tgcgcgacac caaggaggcc     300

ctggacaaga tcgaggagga gcagaacaag agccagcaga gacccagca ggccaaggag     360

gccgacggca aggtgagcca gaactacccc atcgtgcaga acctgcaggg ccagatggtg     420

caccaggcca tcagcccccg cacccctgaac gcctgggtga aggtgatcga ggagaaggcc     480

ttcagcccccg aggtgatccc catgttcacc gccctgagcg agggcgccac ccccccaggac     540

ctgaacacca tgctgaacac cgtgggcggc caccaggccg ccatgcagat gctgaaggac     600

accatcaacg aggaggccgc cgagtgggac cgcctgcacc ccgtgcaggc cggcccccgtg     660

gccccccggcc agatgcgcga cccccgcggc agcgacatcg ccggcgccac cagcaccctg     720

caggagcaga tcgcctggat gaccagcaac cccccgtgc cgtgggcga catctacaag     780

cgctggatca tcctgggcct gaacaagatc gtgcgcatgt acagccccgt gagcatcctg     840

gacatccgcc agggccccaa ggagcccttc cgcgactacg tggaccgctt cttcaagacc     900

ctgcgcgccg agcaggccac ccaggacgtg aagaactgga tgaccgagac cctgctggtg     960

cagaacgcca accccgactg caagaccatc ctgcgcgccc tgggcccccgg cgccaccctg    1020
```

```
gaggagatga tgaccgcctg ccagggcgtg ggcggccccg gccacaaggc ccgcgtgctg      1080

gccgaggcca tgagccaggc caacagcgtg aacatcatga tgcagaagag caacttcaag      1140

ggcccccgcc gcaacgtgaa gtgcttcaac tgcggcaagg agggccacat cgccaagaac      1200

tgccgcgccc cccgcaagaa gggctgctgg aagtgcggca aggagggcca ccagatgaag      1260

gactgcaccg agcgccaggc caacttcctg ggcaagatct ggcccagcca caagggccgc      1320

cccggcaact tcctgcagaa ccgcagcgag cccgccgccc ccaccgtgcc caccgccccc      1380

cccgccgaga gcttccgctt cgaggagacc acccccgccc ccaagcagga gcccaaggac      1440

cgcgagcccct accgcgagcc cctgaccgcc ctgcgcagcc tgttcggcag cggcccccctg      1500

agccagtaa                                                              1509
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<210> 22
<211> 502
<212> PRT
<213> Human immunodeficiency virus

<400> 22

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Met Gly Ala Arg Ala Ser Ile Leu Arg Gly Glu Lys Leu Asp Lys Trp
1               5                   10                  15


Glu Lys Ile Arg Leu Arg Pro Gly Gly Lys Lys His Tyr Met Leu Lys
            20                  25                  30


His Leu Val Trp Ala Ser Arg Glu Leu Glu Gly Phe Ala Leu Asn Pro
        35                  40                  45


Gly Leu Leu Glu Thr Ala Glu Gly Cys Lys Gln Ile Met Lys Gln Leu
    50                  55                  60


Gln Pro Ala Leu Gln Thr Gly Thr Glu Glu Leu Arg Ser Leu Tyr Asn
65                  70                  75                  80


Thr Val Ala Thr Leu Tyr Cys Val His Ala Gly Ile Glu Val Arg Asp
                85                  90                  95


Thr Lys Glu Ala Leu Asp Lys Ile Glu Glu Glu Gln Asn Lys Ser Gln
            100                 105                 110


Gln Lys Thr Gln Gln Ala Lys Glu Ala Asp Gly Lys Val Ser Gln Asn
        115                 120                 125
```

Tyr Pro Ile Val Gln Asn Leu Gln Gly Gln Met Val His Gln Ala Ile
    130   135   140

Ser Pro Arg Thr Leu Asn Ala Trp Val Lys Val Ile Glu Glu Lys Ala
145   150   155   160

Phe Ser Pro Glu Val Ile Pro Met Phe Thr Ala Leu Ser Glu Gly Ala
                165   170   175

Thr Pro Gln Asp Leu Asn Thr Met Leu Asn Thr Val Gly Gly His Gln
                180   185   190

Ala Ala Met Gln Met Leu Lys Asp Thr Ile Asn Glu Glu Ala Ala Glu
            195   200   205

Trp Asp Arg Leu His Pro Val Gln Ala Gly Pro Val Ala Pro Gly Gln
    210   215   220

Met Arg Asp Pro Arg Gly Ser Asp Ile Ala Gly Ala Thr Ser Thr Leu
225   230   235   240

Gln Glu Gln Ile Ala Trp Met Thr Ser Asn Pro Pro Val Pro Val Gly
                245   250   255

Asp Ile Tyr Lys Arg Trp Ile Ile Leu Gly Leu Asn Lys Ile Val Arg
                260   265   270

Met Tyr Ser Pro Val Ser Ile Leu Asp Ile Arg Gln Gly Pro Lys Glu
        275   280   285

Pro Phe Arg Asp Tyr Val Asp Arg Phe Phe Lys Thr Leu Arg Ala Glu
    290   295   300

Gln Ala Thr Gln Asp Val Lys Asn Trp Met Thr Glu Thr Leu Leu Val
305   310   315   320

Gln Asn Ala Asn Pro Asp Cys Lys Thr Ile Leu Arg Ala Leu Gly Pro
                325   330   335

Gly Ala Thr Leu Glu Glu Met Met Thr Ala Cys Gln Gly Val Gly Gly
            340   345   350

```
Pro Gly His Lys Ala Arg Val Leu Ala Glu Ala Met Ser Gln Ala Asn
    355                 360                 365

Ser Val Asn Ile Met Met Gln Lys Ser Asn Phe Lys Gly Pro Arg Arg
    370                 375                 380

Asn Val Lys Cys Phe Asn Cys Gly Lys Glu Gly His Ile Ala Lys Asn
385                 390                 395                 400

Cys Arg Ala Pro Arg Lys Lys Gly Cys Trp Lys Cys Gly Lys Glu Gly
                405                 410                 415

His Gln Met Lys Asp Cys Thr Glu Arg Gln Ala Asn Phe Leu Gly Lys
            420                 425                 430

Ile Trp Pro Ser His Lys Gly Arg Pro Gly Asn Phe Leu Gln Asn Arg
        435                 440                 445

Ser Glu Pro Ala Ala Pro Thr Val Pro Thr Ala Pro Pro Ala Glu Ser
    450                 455                 460

Phe Arg Phe Glu Glu Thr Thr Pro Ala Pro Lys Gln Glu Pro Lys Asp
465                 470                 475                 480

Arg Glu Pro Tyr Arg Glu Pro Leu Thr Ala Leu Arg Ser Leu Phe Gly
                485                 490                 495

Ser Gly Pro Leu Ser Gln
            500


<210>   23
<211>   849
<212>   PRT
<213>   Human immunodeficiency virus

<400>   23

Met Arg Val Met Gly Ile Leu Lys Asn Tyr Gln Gln Trp Trp Met Trp
1                 5                 10                  15

Gly Ile Leu Gly Phe Trp Met Leu Ile Ile Ser Ser Val Val Gly Asn
            20                  25                  30

Leu Trp Val Thr Val Tyr Tyr Gly Val Pro Val Trp Lys Glu Ala Lys
```

24

Thr Thr Leu Phe Cys Thr Ser Asp Ala Lys Ala Tyr Glu Thr Glu Val
    50   55   60

His Asn Val Trp Ala Thr His Ala Cys Val Pro Thr Asp Pro Asn Pro
65   70   75   80

Gln Glu Ile Val Leu Glu Asn Val Thr Glu Asn Phe Asn Met Trp Lys
                85   90   95

Asn Asp Met Val Asp Gln Met His Glu Asp Ile Ile Ser Leu Trp Asp
            100   105   110

Gln Ser Leu Lys Pro Cys Val Lys Leu Thr Pro Leu Cys Val Thr Leu
        115   120   125

Lys Cys Arg Asn Val Asn Ala Thr Asn Asn Ile Asn Ser Met Ile Asp
    130   135   140

Asn Ser Asn Lys Gly Glu Met Lys Asn Cys Ser Phe Asn Val Thr Thr
145   150   155   160

Glu Leu Arg Asp Arg Lys Gln Glu Val His Ala Leu Phe Tyr Arg Leu
            165   170   175

Asp Val Val Pro Leu Gln Gly Asn Asn Ser Asn Glu Tyr Arg Leu Ile
        180   185   190

Asn Cys Asn Thr Ser Ala Ile Thr Gln Ala Cys Pro Lys Val Ser Phe
    195   200   205

Asp Pro Ile Pro Ile His Tyr Cys Thr Pro Ala Gly Tyr Ala Ile Leu
    210   215   220

Lys Cys Asn Asn Gln Thr Phe Asn Gly Thr Gly Pro Cys Asn Asn Val
225   230   235   240

Ser Ser Val Gln Cys Ala His Gly Ile Lys Pro Val Val Ser Thr Gln
            245   250   255

Leu Leu Leu Asn Gly Ser Leu Ala Lys Gly Glu Ile Ile Ile Arg Ser
            260   265   270

25

```
Glu Asn Leu Ala Asn Asn Ala Lys Ile Ile Ile Val Gln Leu Asn Lys
        275             280             285

Pro Val Lys Ile Val Cys Val Arg Pro Asn Asn Asn Thr Arg Lys Ser
    290             295             300

Val Arg Ile Gly Pro Gly Gln Thr Phe Tyr Ala Thr Gly Glu Ile Ile
305             310             315                 320

Gly Asp Ile Arg Gln Ala Tyr Cys Ile Ile Asn Lys Thr Glu Trp Asn
            325             330             335

Ser Thr Leu Gln Gly Val Ser Lys Lys Leu Glu Glu His Phe Ser Lys
            340             345             350

Lys Ala Ile Lys Phe Glu Pro Ser Ser Gly Gly Asp Leu Glu Ile Thr
        355             360             365

Thr His Ser Phe Asn Cys Arg Gly Glu Phe Phe Tyr Cys Asp Thr Ser
    370             375             380

Gln Leu Phe Asn Ser Thr Tyr Ser Pro Ser Phe Asn Gly Thr Glu Asn
385             390             395                 400

Lys Leu Asn Gly Thr Ile Thr Ile Thr Cys Arg Ile Lys Gln Ile Ile
            405             410             415

Asn Met Trp Gln Lys Val Gly Arg Ala Met Tyr Ala Pro Pro Ile Ala
            420             425             430

Gly Asn Leu Thr Cys Glu Ser Asn Ile Thr Gly Leu Leu Leu Thr Arg
    435             440             445

Asp Gly Gly Lys Thr Gly Pro Asn Asp Thr Glu Ile Phe Arg Pro Gly
    450             455             460

Gly Gly Asp Met Arg Asp Asn Trp Arg Asn Glu Leu Tyr Lys Tyr Lys
465             470             475                 480

Val Val Glu Ile Lys Pro Leu Gly Val Ala Pro Thr Glu Ala Lys Arg
            485             490             495
```

```
Arg Val Val Glu Arg Glu Lys Arg Ala Val Gly Ile Gly Ala Val Phe
        500             505                 510

Leu Gly Phe Leu Gly Ala Ala Gly Ser Thr Met Gly Ala Ala Ser Ile
        515             520                 525

Thr Leu Thr Val Gln Ala Arg Leu Leu Leu Ser Gly Ile Val Gln Gln
    530             535                 540

Gln Asn Asn Leu Leu Arg Ala Ile Glu Ala Gln Gln His Leu Leu Gln
545             550                 555                 560

Leu Thr Val Trp Gly Ile Lys Gln Leu Gln Thr Arg Ile Leu Ala Val
            565                 570                 575

Glu Arg Tyr Leu Lys Asp Gln Gln Leu Leu Gly Ile Trp Gly Cys Ser
        580                 585                 590

Gly Lys Leu Ile Cys Thr Thr Ala Val Pro Trp Asn Ser Ser Trp Ser
        595                 600                 605

Asn Arg Ser His Asp Glu Ile Trp Asp Asn Met Thr Trp Met Gln Trp
    610                 615                 620

Asp Arg Glu Ile Asn Asn Tyr Thr Asp Thr Ile Tyr Arg Leu Leu Glu
625                 630                 635                 640

Glu Ser Gln Asn Gln Gln Glu Lys Asn Glu Lys Asp Leu Leu Ala Leu
            645                 650                 655

Asp Ser Trp Gln Asn Leu Trp Asn Trp Phe Ser Ile Thr Asn Trp Leu
            660                 665                 670

Trp Tyr Ile Lys Ile Phe Ile Met Ile Val Gly Gly Leu Ile Gly Leu
        675                 680                 685

Arg Ile Ile Phe Ala Val Leu Ser Ile Val Asn Arg Val Arg Gln Gly
    690             695                 700

Tyr Ser Pro Leu Pro Phe Gln Thr Leu Thr Pro Asn Pro Arg Glu Pro
705             710                 715                 720
```

Asp Arg Leu Gly Arg Ile Glu Glu Glu Gly Gly Glu Gln Asp Arg Gly
            725   730   735

Arg Ser Ile Arg Leu Val Ser Gly Phe Leu Ala Leu Ala Trp Asp Asp
            740   745   750

Leu Arg Ser Leu Cys Leu Phe Ser Tyr His Arg Leu Arg Asp Phe Ile
            755   760   765

Leu Ile Ala Ala Arg Val Leu Glu Leu Leu Gly Gln Arg Gly Trp Glu
            770   775   780

Ala Leu Lys Tyr Leu Gly Ser Leu Val Gln Tyr Trp Gly Leu Glu Leu
785   790   795   800

Lys Lys Ser Ala Ile Ser Leu Leu Asp Thr Ile Ala Ile Ala Val Ala
            805   810   815

Glu Gly Thr Asp Arg Ile Ile Glu Phe Ile Gln Arg Ile Cys Arg Ala
            820   825   830

Ile Arg Asn Ile Pro Arg Arg Ile Arg Gln Gly Phe Glu Ala Ala Leu
            835   840   845

Gln

<210>   24
<211>   855
<212>   PRT
<213>   Human immunodeficiency virus

<400>   24

Met Arg Val Arg Gly Ile Leu Arg Ser Trp Gln Gln Trp Trp Ile Trp
1   5   10   15

Gly Ile Leu Gly Phe Trp Ile Cys Ser Gly Leu Gly Asn Leu Trp Val
            20   25   30

Thr Val Tyr Asp Gly Val Pro Val Trp Arg Glu Ala Ser Thr Thr Leu
            35   40   45

Phe Cys Ala Ser Asp Ala Lys Ala Tyr Glu Lys Glu Val His Asn Val
    50   55   60

28

```
Trp Ala Thr His Ala Cys Val Pro Thr Asp Pro Asn Pro Gln Glu Ile
65             70           75              80


Glu Leu Asp Asn Val Thr Glu Asn Phe Asn Met Trp Lys Asn Asp Met
            85              90              95


Val Asp Gln Met His Glu Asp Ile Ile Ser Leu Trp Asp Gln Ser Leu
        100             105             110


Lys Pro Arg Val Lys Leu Thr Pro Leu Cys Val Thr Leu Lys Cys Thr
        115             120             125


Asn Tyr Ser Thr Asn Tyr Ser Asn Thr Met Asn Ala Thr Ser Tyr Asn
    130             135             140


Asn Asn Thr Thr Glu Glu Ile Lys Asn Cys Thr Phe Asn Met Thr Thr
145             150             155             160


Glu Leu Arg Asp Lys Lys Gln Gln Val Tyr Ala Leu Phe Tyr Lys Leu
            165             170             175


Asp Ile Val Pro Leu Asn Ser Asn Ser Ser Glu Tyr Arg Leu Ile Asn
        180             185             190


Cys Asn Thr Ser Ala Ile Thr Gln Ala Cys Pro Lys Val Ser Phe Asp
        195             200             205


Pro Ile Pro Ile His Tyr Cys Ala Pro Ala Gly Tyr Ala Ile Leu Lys
    210             215             220


Cys Lys Asn Asn Thr Ser Asn Gly Thr Gly Pro Cys Gln Asn Val Ser
225             230             235             240


Thr Val Gln Cys Thr His Gly Ile Lys Pro Val Val Ser Thr Pro Leu
            245             250             255


Leu Leu Asn Gly Ser Leu Ala Glu Gly Gly Glu Ile Ile Ile Arg Ser
            260             265             270


Lys Asn Leu Ser Asn Asn Ala Tyr Thr Ile Ile Val His Leu Asn Asp
        275             280             285
```

29

Ser Val Glu Ile Val Cys Thr Arg Pro Asn Asn Asn Thr Arg Lys Gly
    290   295   300

Ile Arg Ile Gly Pro Gly Gln Thr Phe Tyr Ala Thr Glu Asn Ile Ile
305   310   315   320

Gly Asp Ile Arg Gln Ala His Cys Asn Ile Ser Ala Gly Glu Trp Asn
                325   330   335

Lys Ala Val Gln Arg Val Ser Ala Lys Leu Arg Glu His Phe Pro Asn
                340   345   350

Lys Thr Ile Glu Phe Gln Pro Ser Ser Gly Gly Asp Leu Glu Ile Thr
            355   360   365

Thr His Ser Phe Asn Cys Arg Gly Glu Phe Phe Tyr Cys Asn Thr Ser
        370   375   380

Lys Leu Phe Asn Ser Ser Tyr Asn Gly Thr Ser Tyr Arg Gly Thr Glu
385   390   395   400

Ser Asn Ser Ser Ile Ile Thr Leu Pro Cys Arg Ile Lys Gln Ile Ile
                405   410   415

Asp Met Trp Gln Lys Val Gly Arg Ala Ile Tyr Ala Pro Pro Ile Glu
            420   425   430

Gly Asn Ile Thr Cys Ser Ser Ser Ile Thr Gly Leu Leu Leu Ala Arg
        435   440   445

Asp Gly Gly Leu Asp Asn Ile Thr Thr Glu Ile Phe Arg Pro Gln Gly
    450   455   460

Gly Asp Met Lys Asp Asn Trp Arg Asn Glu Leu Tyr Lys Tyr Lys Val
465   470   475   480

Val Glu Ile Lys Pro Leu Gly Val Ala Pro Thr Glu Ala Lys Arg Arg
                485   490   495

Val Val Glu Arg Glu Lys Arg Ala Val Gly Ile Gly Ala Val Ile Phe
                500   505   510

Gly Phe Leu Gly Ala Ala Gly Ser Asn Met Gly Ala Ala Ser Ile Thr
        515   520   525

Leu Thr Ala Gln Ala Arg Gln Leu Leu Ser Gly Ile Val Gln Gln Gln
        530   535   540

Ser Asn Leu Leu Arg Ala Ile Glu Ala Gln Gln His Met Leu Gln Leu
545   550   555   560

Thr Val Trp Gly Ile Lys Gln Leu Gln Ala Arg Val Leu Ala Ile Glu
                565   570   575

Arg Tyr Leu Lys Asp Gln Gln Leu Leu Gly Ile Trp Gly Cys Ser Gly
            580   585   590

Lys Leu Ile Cys Thr Thr Thr Val Pro Trp Asn Ser Ser Trp Ser Asn
            595   600   605

Lys Thr Gln Gly Glu Ile Trp Glu Asn Met Thr Trp Met Gln Trp Asp
        610   615   620

Lys Glu Ile Ser Asn Tyr Thr Gly Ile Ile Tyr Arg Leu Leu Glu Glu
625   630   635   640

Ser Gln Asn Gln Gln Glu Gln Asn Glu Lys Asp Leu Leu Ala Leu Asp
            645   650   655

Ser Arg Asn Asn Leu Trp Ser Trp Phe Asn Ile Ser Asn Trp Leu Trp
            660   665   670

Tyr Ile Lys Ile Phe Ile Met Ile Val Gly Gly Leu Ile Gly Leu Arg
        675   680   685

Ile Ile Phe Ala Val Leu Ser Ile Val Asn Arg Val Arg Gln Gly Tyr
        690   695   700

Ser Pro Leu Ser Phe Gln Thr Leu Thr Pro Asn Pro Arg Gly Leu Asp
705   710   715   720

Arg Leu Gly Arg Ile Glu Glu Glu Gly Gly Glu Gln Asp Arg Asp Arg
            725   730   735

Ser Ile Arg Leu Val Gln Gly Phe Leu Ala Leu Ala Trp Asp Asp Leu

31

Arg Ser Leu Cys Leu Phe Ser Tyr His Arg Leu Arg Asp Leu Ile Leu
        755   760   765

Val Thr Ala Arg Val Val Glu Leu Leu Gly Arg Ser Ser Pro Arg Gly
    770   775   780

Leu Gln Arg Gly Trp Glu Ala Leu Lys Tyr Leu Gly Ser Leu Val Gln
785   790   795   800

Tyr Trp Gly Leu Glu Leu Lys Lys Ser Ala Thr Ser Leu Leu Asp Ser
            805   810   815

Ile Ala Ile Ala Val Ala Glu Gly Thr Asp Arg Ile Ile Glu Val Ile
        820   825   830

Gln Arg Ile Tyr Arg Ala Phe Cys Asn Ile Pro Arg Arg Val Arg Gln
        835   840   845

Gly Phe Glu Ala Ala Leu Gln
    850   855

<210> 25
<211> 20
<212> PRT
<213> Human immunodeficiency virus

<400> 25

Asp Ile Lys Gln Gly Pro Lys Glu Pro Phe Arg Asp Tyr Val Asp Arg
1   5   10   15

Phe Phe Lys Thr
        20

<210> 26
<211> 60
<212> DNA
<213> Human immunodeficiency virus

<400> 26
gacataaaac aaggaccaaa agagcccttt agagactatg tagaccggtt ctttaaaacc   60

<210> 27
<211> 20

<212> PRT
<213> Human immunodeficiency virus

<400> 27

Asp Ile Arg Gln Gly Pro Lys Glu Pro Phe Arg Asp Tyr Val Asp Arg
1   5   10   15

Phe Phe Lys Thr
            20

<210> 28
<211> 47
<212> PRT
<213> Human immunodeficiency virus

<400> 28

Thr Ile Thr Ile Thr Cys Arg Ile Lys Gln Ile Ile Asn Met Trp Gln
1   5   10   15

Lys Val Gly Arg Ala Met Tyr Ala Pro Pro Ile Ala Gly Asn Leu Thr
            20   25   30

Cys Glu Ser Asn Ile Thr Gly Leu Leu Leu Thr Arg Asp Gly Gly
        35   40   45

<210> 29
<211> 48
<212> PRT
<213> Human immunodeficiency virus

<400> 29

Ser Ile Ile Thr Leu Pro Cys Arg Ile Lys Gln Ile Ile Asp Met Trp
1   5   10   15

Gln Lys Val Gly Arg Ala Ile Tyr Ala Pro Pro Ile Glu Gly Asn Ile
            20   25   30

Thr Cys Ser Ser Ser Ile Thr Gly Leu Leu Leu Ala Arg Asp Gly Gly
        35   40   45

<210> 30
<211> 2469
<212> DNA
<213> Artificial

<220>

33

<400> 30

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cgcagcaact tcaagggccc caagcgcatc atcaagtgct tcaactgcgg caaggagggc     120

cacatcgccc gcaactgccg cgccccccgc aagaagggct gctggaagtg cggcaaggag     180

ggccaccaga tgaaggactg caccgagcgc caggccaact tcttccgcga ggacctggcc     240

ttcccccagg gcaaggcccg cgagttcccc agcgagcaga accgcgccaa cagccccacc     300

agccgcgagc tgcaggtgcg cggcgacaac ccccgcagcg aggccggcgc cgagcgccag     360

ggcaccctga acttccccca gatcaccctg tggcagcgcc ccctggtgag catcaaggtg     420

ggcggccaga tcaaggaggc cctgctggac accggcgccg acgaccgt gctggaggag     480

atgagcctgc ccggcaagtg gaagcccaag atgatcggcg gcatcggcgg cttcatcaag     540

gtgcgccagt acgaccagat cctgatcgag atctgcggca agaaggccat cggcaccgtg     600

ctgatcggcc ccaccccgt gaacatcatc ggccgcaaca tgctgaccca gctgggctgc     660

accctgaact tccccatcag ccccatcgag accgtgcccg tgaagctgaa gcccggcatg     720

gacggcccca aggtgaagca gtggcccctg accgaggaga agatcaaggc cctgaccgcc     780

atctgcgagg agatggagaa ggagggcaag atcaccaaga tcggccccga gaaccccta     840

aacaccccg tgttcgccat caagaagaag gacagcacca gtggcgcaa gctggtggac     900

ttccgcgagc tgaacaagcg cacccaggac ttctgggagg tgcagctggg catcccccac     960

cccgccggcc tgaagaagaa gaagagcgtg accgtgctgg acgtgggcga cgcctacttc    1020

agcgtgcccc tggacgagga cttccgcaag tacaccgcct tcaccatccc cagcatcaac    1080

aacgagaccc ccggcatccg ctaccagtac aacgtgctgc cccagggctg gaagggcagc    1140

cccagcatct tccagagcag catgaccaag atcctggagc ccttccgcgc ccgcaacccc    1200

gagatcgtga tctaccagta catggacgac ctgtacgtgg gcagcgacct ggagatcggc    1260

cagcaccgcg ccaagatcga ggagctgcgc aagcacctgc tgcgctgggg cttcaccacc    1320

cccgacaaga agcaccagaa ggagcccccc ttcctgtgga tgggctacga gctgcacccc    1380

gacaagtgga ccgtgcagcc catcgagctg cccgagaagg agagctggac cgtgaacgac    1440

atccagaagc tggtgggcaa gctgaactgg gccagccaga tctaccccgg catcaaggtg    1500

cgccagctgt gcaagctgct gcgcggcgcc aaggccctga ccgacatcgt gcccctgacc    1560

gaggaggccg agctggagct ggccgagaac cgcgagatcc tgcgcgagcc cgtgcacggc    1620
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34

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gtgtactacg accccagcaa ggacctggtg gccgagatcc agaagcaggg ccacgaccag   1680

tggacctacc agatctacca ggagcccttc aagaacctga agaccggcaa gtacgccaag   1740

atgcgcaccg cccacaccaa cgacgtgaag cagctgaccg aggccgtgca gaagatcgcc   1800

atggagagca tcgtgatctg gggcaagacc cccaagttcc gcctgcccat ccagaaggag   1860

acctgggaga cctggtggac cgactactgg caggccacct ggatccccga gtgggagttc   1920

gtgaacaccc cccccctggt gaagctgtgg taccagctgg agaaggagcc catcatcggc   1980

gccgagacct tctacgtgga cggcgccgcc aaccgcgaga ccaagatcgg caaggccggc   2040

tacgtgaccg accggggccg gcagaagatc gtgagcctga ccgagaccac caaccagaag   2100

accgagctgc aggccatcca gctggccctg caggacagcg gcagcgaggt gaacatcgtg   2160

accgacagcc agtacgccct gggcatcatc caggcccagc ccgacaagag cgagagcgag   2220

ctggtgaacc agatcatcga gcagctgatc aagaaggaga aggtgtacct gagctgggtg   2280

cccgcccaca agggcatcgg cggcaacgag cagatcgaca agctggtgag caagggcatc   2340

cgcaaggtgc tgttcctgga cggcatcgat ggcggcatcg tgatctacca gtacatggac   2400

gacctgtacg tgggcagcgg cggccctagg atcgattaaa agcttcccgg ggctagcacc   2460

ggtgaattc                                                           2469


<210>  31
<211>  2463
<212>  DNA
<213>  Artificial

<220>
<223>  PR975YM

<400>  31
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43

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<213>  Human immunodeficiency virus

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44

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45

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<213>   Human immunodeficiency virus

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<212>   PRT
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Gly Gly



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48

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49

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51

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52

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gcagcaatag atctcagctt ctttttaaaa gaaaaggggg gactggaagg gttaatttac   9120

tccaagaaaa ggcaagagat ccttgatttg tgggtttata acacacaagg cttcttccct   9180

gattggcaaa actacacacc gggaccaggg gtcagatttc cactgacctt tggatggtac   9240

ttcaagctag agccagtcga tccaagggaa gtagaagagg ccaatgaagg agaaaacaac   9300

tgtttactac accctatgag ccagcatgga atggaggatg aagacagaga agtattaaga   9360

tggaagtttg acagtacgct agcacgcaga cacatggccc gcgagctaca tccggagtat   9420

tacaaagact gctgacacag aagggacttt ccgctgggac tttccactgg ggcgttccag   9480

gaggtgtggt ctgggcggga caggggagtg gtcagccctg agatgctgca tataagcagc   9540

tgcttttcgc ctgtactggg tctctctagg tagaccagat ctgagcccgg gagctctctg   9600

gctatctagg gaacccactg cttaagcctc aataaagctt gccttgagtg ccttgagtag   9660

tgtgtgcccg tctgttgtgt gactctggta actagagatc cctcagacca cttgtggtag   9720
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53

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tgtggaaaat ctctagca                                                    9738


<210>   46
<211>   97
<212>   DNA
<213>   Artificial

<220>
<223>   HIV Type C Env Optimized common region short

<400>   46
catcaccctg cagtgcaaga tcaagcagat cgtgcgcatg tggcagggcg tgggccaggc     60

catgtacgcc cccccatcg ccggcaacat cacctgc                              97


<210>   47
<211>   144
<212>   DNA
<213>   Artificial

<220>
<223>   HIV Type C Env Optimized common region

<400>   47
ctgcccatca ccctgcagtg caagatcaag cagatcgtgc gcatgtggca gggcgtgggc     60

caggccatgt acgccccccc catcgccggc aacatcacct gccgcagcaa catcaccggc    120

atcctgctga cccgcgacgg cggc                                           144


<210>   48
<211>   144
<212>   DNA
<213>   Artificial

<220>
<223>   HIV Type C Env wild type common region

<400>   48
ttacccatca cactccaatg caaaataaaa caaattgtac gcatgtggca gggggtagga     60

caagcaatgt atgcccctcc cattgcagga aacataacat gtagatcaaa catcacagga    120

atactattga cacgtgatgg ggga                                           144


<210>   49
<211>   2610
<212>   DNA
<213>   Artificial

<220>
<223>   HIV Type C Envgp160 optimized
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54

<400> 49

atgcgcgtga tgggcaccca gaagaactgc cagcagtggt ggatctgggg catcctgggc   60

ttctggatgc tgatgatctg caacaccgag gacctgtggg tgaccgtgta ctacggcgtg   120

cccgtgtggc gcgaggccaa gaccaccctg ttctgcgcca gcgacgccaa ggcctacgag   180

accgaggtgc acaacgtgtg ggccacccac gcctgcgtgc ccaccgaccc caacccccag   240

gagatcgtgc tgggcaacgt gaccgagaac ttcaacatgt ggaagaacaa catggccgac   300

cagatgcacg aggacatcat cagcctgtgg gaccagagcc tgaagccctg cgtgaagctg   360

accccctgt gcgtgaccct gaactgcacc gacaccaacg tgaccggcaa ccgcaccgtg   420

accggcaaca ccaacgacac caacatcgcc aacgccacct acaagtacga ggagatgaag   480

aactgcagct tcaacgccac caccgagctg cgcgacaaga gcacaagga gtacgccctg   540

ttctacaagc tggacatcgt gcccctgaac gagaacagca caacttcac ctaccgcctg   600

atcaactgca caccagcac catcacccag gcctgcccca aggtgagctt cgaccccatc   660

cccatccact actgcgcccc cgccgactac gccatcctga gtgcaacaa caagaccttc   720

aacggcaccg gcccctgcta caacgtgagc accgtgcagt gcacccacgg catcaagccc   780

gtggtgagca cccagctgct gctgaacggc agcctggccg aggagggcat catcatccgc   840

agcgagaacc tgaccgagaa caccaagacc atcatcgtgc acctgaacga gagcgtggag   900

atcaactgca cccgccccaa caacaacacc cgcaagagcg tgcgcatcgg ccccggccag   960

gccttctacg ccaccaacga cgtgatcggc aacatccgcc aggcccactg caacatcagc   1020

accgaccgct ggaacaagac cctgcagcag gtgatgaaga agctgggcga gcacttcccc   1080

aacaagacca tcaagttcga gccccacgcc ggcggcgacc tggagatcac catgcacagc   1140

ttcaactgcc gcggcgagtt cttctactgc aacaccagca acctgttcaa cagcacctac   1200

taccccaaga cggcaccta caagtacaac ggcaacagca gcctgcccat caccctgcag   1260

tgcaagatca gcagatcgt gcgcatgtgg cagggcgtgg ccaggccat gtacgccccc   1320

cccatcgccg gcaacatcac ctgccgcagc aacatcaccg gcatcctgct gacccgcgac   1380

ggcggcttca acaacaccaa caacgacacc gaggagacct tccgccccgg cggcggcgac   1440

atgcgcgaca actggcgcag cgagctgtac aagtacaagg tggtggagat caagcccctg   1500

ggcatcgccc ccaccaaggc caagcgccgc gtggtgcagc gcaagaagcg cgccgtgggc   1560

atcggcgccg tgttcctggg cttcctgggc gccgccggca gcaccatggg cgccgccagc   1620

atcaccctga ccgtgcaggc ccgccagctg ctgagcggca tcgtgcagca gcagagcaac   1680

55

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cagctgcagg cccgcgtgct ggccatcgag cgctacctga aggaccagca gctgctgggc   1800

atctggggct gcagcggccg cctgatctgc accaccgccg tgccctggaa cagcagctgg   1860

agcaacaaga gcgaggccga catctgggac aacatgacct ggatgcagtg ggaccgcgag   1920

atcaacaact acaccgagac catcttccgc ctgctggagg acagccagaa ccagcaggag   1980

aagaacgaga aggacctgct ggagctggac aagtggaaca acctgtggaa ctggttcgac   2040

atcagcaact ggctgtggta catcaagatc ttcatcatga tcgtgggcgg cctgatcggc   2100

ctgcgcatca tcttcgccgt gctgagcatc gtgaaccgcg tgcgccaggg ctacagcccc   2160

ctgagcttcc agaccctgac ccccagcccc cgcggcctgg accgcctggg cggcatcgag   2220

gaggagggcg gcgagcagga ccgcgaccgc agcatccgcc tggtgagcgg cttcctgagc   2280

ctggcctggg acgacctgcg cagcctgtgc ctgttcagct accaccgcct gcgcgacttc   2340

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cgcggctggg agatcctgaa gtacctgggc agcctggtgc agtactgggg cctggagctg   2460

aagaagagcg ccatcagccc cctggacacc atcgccatcg ccgtggccga gggcaccgac   2520

cgcatcatcg agctggtgca gcgcatctgc cgcgccatcc tgaacatccc cgccgcatc   2580

cgccagggct cgaggccgc cctgctgtaa   2610

<210>   50
<211>   2610
<212>   DNA
<213>   Artificial

<220>
<223>   Type C Envgp160 wild type

<400>   50
atgagagtga tggggacaca gaagaattgt caacaatggt ggatatgggg catcttaggc   60

ttctggatgc taatgatttg taacacggag gacttgtggg tcacagtcta ctatggggta   120

cctgtgtgga gagaagcaaa aactactcta ttctgtgcat cagatgctaa agcatatgag   180

acagaagtgc ataatgtctg ggctacacat gcttgtgtac ccacagaccc caacccacaa   240

gaaatagttt tgggaaatgt aacagaaaat tttaatatgt ggaaaaataa catggcagat   300

cagatgcatg aggatataat cagtttatgg gatcaaagcc taaagccatg tgtaaagttg   360

accccactct gtgtcacttt aaactgtaca gatacaaatg ttacaggtaa tagaactgtt   420

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acaggtaata caaatgatac caatattgca aatgctacat ataagtatga agaaatgaaa    480

aattgctctt tcaatgcaac cacagaatta agagataaga aacataaaga gtatgcactc    540

ttttataaac ttgatatagt accacttaat gaaaatagta caactttac atatagatta    600

ataaattgca atacctcaac cataacacaa gcctgtccaa aggtctcttt tgacccgatt    660

cctatacatt actgtgctcc agctgattat gcgattctaa agtgtaataa taagacattc    720

aatgggacag gaccatgtta taatgtcagc acagtacaat gtacacatgg aattaagcca    780

gtggtatcaa ctcaactact gttaaatggt agtctagcag aagaagggat aataattaga    840

tctgaaaatt tgacagagaa taccaaaaca ataatagtac atcttaatga atctgtagag    900

attaattgta caaggcccaa caataataca aggaaaagtg taaggatagg accaggacaa    960

gcattctatg caacaaatga cgtaatagga aacataagac aagcacattg taacattagt   1020

acagatagat ggaataaaac tttacaacag gtaatgaaaa aattaggaga gcatttccct   1080

aataaaacaa taaaatttga accacatgca ggaggggatc tagaaattac aatgcatagc   1140

tttaattgta gaggagaatt tttctattgc aatacatcaa acctgtttaa tagtacatac   1200

taccctaaga atggtacata caaatacaat ggtaattcaa gcttacccat cacactccaa   1260

tgcaaaataa aacaaattgt acgcatgtgg caaggggtag acaagcaat gtatgcccct   1320

cccattgcag gaaacataac atgtagatca aacatcacag gaatactatt gacacgtgat   1380

gggggattta acaacacaaa caacgacaca gaggagacat tcagacctgg aggaggagat   1440

atgagggata actggagaag tgaattatat aaatataaag tggtagaaat taagccattg   1500

ggaatagcac ccactaaggc aaaaagaaga gtggtgcaga gaaaaaaag agcagtggga   1560

ataggagctg tgttccttgg gttcttggga gcagcaggaa gcactatggg cgcagcgtca   1620

ataacgctga cggtacaggc cagacaactg ttgtctggta tagtgcaaca gcaaagcaat   1680

ttgctgaagg ctatagaggc gcaacagcat atgttgcaac tcacagtctg gggcattaag   1740

cagctccagg cgagagtcct ggctatagaa agatacctaa aggatcaaca gctcctaggg   1800

atttggggct gctctggaag actcatctgc accactgctg tgccttggaa ctccagttgg   1860

agtaataaat ctgaagcaga tatttgggat aacatgactt ggatgcagtg ggatagagaa   1920

attaataatt acacagaaac aatattcagg ttgcttgaag actcgcaaaa ccagcaggaa   1980

aagaatgaaa aagatttatt agaattggac aagtggaata atctgtggaa ttggtttgac   2040

atatcaaact ggctgtggta tataaaaata ttcataatga tagtaggagg cttgataggt   2100

ttaagaataa tttttgctgt gctctctata gtgaatagag ttaggcaggg atactcacct   2160
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57

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ttgtcatttc agacccttac cccaagcccg aggggactcg acaggctcgg aggaatcgaa    2220

gaagaaggtg gagagcaaga cagagacaga tccatacgat tggtgagcgg attcttgtcg    2280

cttgcctggg acgatctgcg gagcctgtgc ctcttcagct accaccgctt gagagacttc    2340

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aggggtgggg agatccttaa gtatctggga agtcttgtgc agtattgggg tctagagcta    2460

aaaaagagtg ctattagtcc gcttgatacc atagcaatag cagtagctga aggaacagat    2520

aggattatag aattggtaca aagaatttgt agagctatcc tcaacatacc taggagaata    2580

agacagggct ttgaagcagc tttgctataa                                     2610


<210>  51
<211>  1494
<212>  DNA
<213>  Artificial

<220>
<223>  HIV Type C Gag optimized

<400>  51
atgggcgccc gcgccagcat cctgagcggc ggcaagctgg acaagtggga gcgcatccgc     60

ctgcgccccg gcggcaagaa gcactacatg ctgaagcacc tggtgtgggc cagccgcgag    120

ctggagcgct tcgccctgaa ccccggcctg ctggagacca gcgagggctg caagcagatc    180

atcaagcagc tgcagcccgc cctgcagacc ggcaccgagg agctgcgcag cctgttcaac    240

accgtggcca ccctgtactg cgtgcacaag ggcatcgagg tgcgcgacac caaggaggcc    300

ctggacaaga tcgaggagga gcagaacaag tgccagcaga aggcccagca ggccaaggcc    360

gccgacgaga aggtgagcca gaactacccc atcgtgcaga cgcccaggg ccagatggtg    420

caccaggcca tcagcccccg caccctgaac gcctggatca aggtgatcga ggagaaggcc    480

ttcaaccccg aggagatccc catgttcacc gccctgagcg agggcgccac cccccaggac    540

ctgaacacca tgctgaacac cgtgggcggc caccaggccg ccatgcagat gctgaaggac    600

accatcaacg aggaggccgc cgagtgggac cgcacccacc ccgtgcacgc cggccccgtg    660

gcccccggcc agatgcgcga ccccgcggc agcgacatcg ccggcaccac cagcaccctg    720

caggagcaga tcgcctggat gaccagcaac ccccccatcc ccgtggagga catctacaag    780

cgctggatca tcctgggcct gaacaagatc gtgcgcatgt acagccccgt gagcatcctg    840

gacatcaagc agggccccaa ggagcccttc cgcgactacg tggaccgctt cttcaagacc    900
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58

ctgcgcgccg agcaggccac ccaggacgtg aagaactgga tgaccgacac cctgctggtg   960

cagaacgcca accccgactg caagaccatc ctgcgcgccc tgggcccccgg cgccagcctg   1020

gaggagatga tgaccgcctg ccagggcgtg ggcggcccca gccacaaggc ccgcgtgctg   1080

gccgaggcca tgagccaggc caacagcaac atcctggtgc agcgcagcaa cttcaagggc   1140

agcaaccgca tcatcaagtg cttcaactgc ggcaaggtgg ccacatcgc ccgcaactgc   1200

cgcgccccc gcaagaaggg ctgctggaag tgcggccagg agggccacca gatgaaggac   1260

tgcaccgagc gccaggccaa cttcctgggc aagatctggc ccagccacaa gggccgcccc   1320

ggcaacttcc tgcagaaccg ccccgagccc accgcccccc cgccgagcc caccgccccc   1380

cccgccgaga gcttccgctt cgaggagacc accccgtgc cccgcaagga gaaggagcgc   1440

gagcccctga ccagcctgaa gagcctgttc ggcagcgacc ccctgagcca gtaa   1494

<210> 52
<211> 1494
<212> DNA
<213> Artificial

<220>
<223> HIV Type C Gag Wild Type

<400> 52
atgggtgcga gagcgtcaat attaagcggc ggaaaattag ataaatggga agaattagg   60

ttaaggccag ggggaaagaa acattatatg ttaaaacatc tagtatgggc aagcagggag   120

ctggaaagat ttgcacttaa ccctggcctg ttagaaacat cagaaggctg taaacaaata   180

ataaaacagc tacaaccagc tcttcagaca ggaacagagg aacttagatc attattcaac   240

acagtagcaa ctctctattg tgtacataaa gggatagagg tacgagacac caaggaagcc   300

ttagacaaga tagaggaaga acaaaacaaa tgtcagcaaa aagcacaaca ggcaaaagca   360

gctgacgaaa aggtcagtca aaattatcct atagtacaga tgcccaagg caaatggta   420

caccaagcta tatcacctag aacattgaat gcatggataa aagtaataga ggaaaaggct   480

ttcaatccag aggaaatacc catgtttaca gcattatcag aaggagccac cccacaagat   540

ttaaacacaa tgttaaatac agtgggggga catcaagcag ccatgcaaat gttaaaagat   600

accatcaatg aggaggctgc agaatgggat aggacacatc cagtacatgc agggcctgtt   660

gcaccaggcc agatgagaga accaaggga agtgacatag caggaactac tagtaccctt   720

caggaacaaa tagcatggat gacaagtaat ccacctattc cagtagaaga catctataaa   780

agatggataa ttctggggtt aaataaaata gtaagaatgt atagccctgt tagcatttg   840

59

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gacataaaac aagggccaaa agaacccttt agagactatg tagaccggtt ctttaaaacc      900

ttaagagctg aacaagctac acaagatgta aagaattgga tgacagacac cttgttggtc      960

caaaatgcga acccagattg taagaccatt ttaagagcat taggaccagg ggcctcatta     1020

gaagaaatga tgacagcatg tcagggagtg ggaggaccta gccataaagc aagagtgttg     1080

gctgaggcaa tgagccaagc aaacagtaac atactagtgc agagaagcaa ttttaaaggc     1140

tctaacagaa ttattaaatg tttcaactgt ggcaaagtag ggcacatagc cagaaattgc     1200

agggccccta ggaaaaaggg ctgttggaaa tgtggacagg aaggacacca aatgaaagac     1260

tgtactgaga ggcaggctaa ttttttaggg aaaatttggc cttcccacaa ggggaggcca     1320

gggaatttcc tccagaacag accagagcca acagccccac cagcagaacc aacagcccca     1380

ccagcagaga gcttcaggtt cgaggagaca accccgtgc cgaggaagga gaaagagagg     1440

gaacctttaa cttccctcaa atcactcttt ggcagcgacc ccttgtctca ataa          1494


<210>   53
<211>   60
<212>   DNA
<213>   Artificial

<220>
<223>   HIV Type C Gag Major Homology Region Optimized

<400>   53
gacatcaagc agggccccaa ggagcccttc cgcgactacg tggaccgctt cttcaagacc       60


<210>   54
<211>   60
<212>   DNA
<213>   Artificial

<220>
<223>   HIV Type C Gag Major Homology Region Wild Type

<400>   54
gacataaaac aagggccaaa agaacccttt agagactatg tagaccggtt ctttaaaacc       60


<210>   55
<211>   624
<212>   DNA
<213>   Artificial

<220>
<223>   HIV Type C Nef Optimized

<400>   55
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atgggcggca agtggagcaa gcgcagcatc gtgggctggc ccgccgtgcg cgagcgcatg      60

cgccgcaccg agcccgccgc cgagggcgtg ggcgccgcca gccaggacct ggaccgccac     120

ggcgccctga ccagcagcaa cacccccgcc accaacgagg cctgcgcctg gctgcaggcc     180

caggaggagg acggcgacgt gggcttcccc gtgcgccccc aggtgcccct gcgccccatg     240

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ctgatctaca gccgcaagcg ccaggagatc ctggacctgt gggtgtacaa cacccagggc     360

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gaggacaact gcctgctgca ccccatgagc cagcacggcg ccgaggacga ggaccgcgag     540

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cccgagtact acaaggactg ctga                                           624


<210>   56
<211>   624
<212>   DNA
<213>   Artificial

<220>
<223>   HIV Type C Nef Wild Type

<400>   56
atgggaggca agtggtcaaa acgcagcata gttggatggc ctgcagtaag agaaagaatg      60

agaagaactg agccagcagc agagggagta ggagcagcgt ctcaagactt agatagacat     120

ggggcactta caagcagcaa cacacctgct actaatgaag cttgtgcctg gctgcaagca     180

caagaggagg acggagatgt aggctttcca gtcagacctc aggtaccttt aagaccaatg     240

acttataaga gtgcagtaga tctcagcttc tttttaaaag aaaaggggg actggaaggg     300

ttaatttact ctaggaaaag gcaagaaatc cttgatttgt gggtctataa cacacaaggc     360

ttcttccctg attggcaaaa ctacacatcg gggccagggg tccgattccc actgaccttt     420

ggatggtgct tcaagctagt accagttgac ccaagggagg tgaaagaggc caatgaagga     480

gaagacaact gtttgctaca ccctatgagc caacatggag cagaggatga agatagagaa     540

gtattaaagt ggaagtttga cagccttcta gcacacagac acatggcccg cgagctacat     600

ccggagtatt acaaagactg ctga                                           624


<210>   57
<211>   624
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<212> DNA
<213> Artificial

<220>
<223> HIV Type C NefD125G Optimized

<400> 57
atgggcggca agtggagcaa gcgcagcatc gtgggctggc ccgccgtgcg cgagcgcatg   60

cgccgcaccg agcccgccgc cgagggcgtg ggcgccgcca gccaggacct ggaccgccac   120

ggcgccctga ccagcagcaa caccccgcc accaacgagg cctgcgcctg gctgcaggcc   180

caggaggagg acggcgacgt gggcttcccc gtgcgccccc aggtgcccct gcgccccatg   240

acctacaaga gcgccgtgga cctgagcttc ttcctgaagg agaagggcgg cctggagggc   300

ctgatctaca gccgcaagcg ccaggagatc ctggacctgt gggtgtacaa cacccagggc   360

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ggctggtgct tcaagctggt gcccgtggac ccccgcgagg tgaaggaggc caacgagggc   480

gaggacaact gcctgctgca ccccatgagc cagcacggcg ccgaggacga ggaccgcgag   540

gtgctgaagt ggaagttcga cagcctgctg gcccaccgcc acatggcccg cgagctgcac   600

cccgagtact acaaggactg ctga   624

<210> 58
<211> 354
<212> DNA
<213> Artificial

<220>
<223> HIV Type C p15RNaseH Optimized

<400> 58
accttctacg tggacggcgc caccaaccgc gaggccaaga tcggcaaggc cggctacgtg   60

accgaccgcg ccgccagaa gatcgtgacc ctgaccaaca ccaccaacca gaagaccgag   120

ctgcaggcca tccagctggc cctgcaggac agcggcagcg aggtgaacat cgtgaccgac   180

agccagtacg ccctgggcat catccaggcc cagcccgaca agagcgacag cgagatcttc   240

aaccagatca tcgagcagct gatcaacaag gagcgcatct acctgagctg ggtgcccgcc   300

cacaagggca tcggcggcaa cgagcaggtg gacaagctgg tgagcaaggg catc   354

<210> 59
<211> 354
<212> DNA
<213> Artificial

<220>
<223> HIV Type C p15RNaseH Wild Type

<400> 59
actttctatg tagatggagc aactaatagg gaagctaaaa taggaaaagc agggtatgtt   60

actgacagag gaaggcagaa aattgttact ctaactaaca caacaaatca gaagactgag   120

ttacaagcaa ttcagctagc tctgcaggat tcaggatcag aagtaaacat agtaacagac   180

tcacagtatg cattaggaat cattcaagca caaccagata agagtgactc agagatattt   240

aaccaaataa tagaacagtt aataaacaag gaaagaatct acctgtcatg ggtaccagca   300

cataaaggaa ttgggggaaa tgaacaagta gataaattag taagtaaggg aatt   354

<210> 60
<211> 876
<212> DNA
<213> Artificial

<220>
<223> HIV Type C p31Int Optimized

<400> 60
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agcaactggc gcgccatggc caacgagttc aacctgcccc ccatcgtggc caaggagatc   120

gtggccagct gcgacaagtg ccagctgaag ggcgaggcca tccacggcca ggtggactgc   180

agccccggca tctggcagct ggactgcacc cacctggagg caagatcat cctggtggcc   240

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accgcctact tcatcctgaa gctggccggc cgctggcccg tgaaggtgat ccacaccgac   360

aacggcagca acttcaccag caccgccgtg aaggccgcct gctggtgggc cggcatccag   420

caggagttcg gcatcccta caacccccag agccagggcg tggtggagag catgaacaag   480

gagctgaaga agatcatcgg ccaggtgcgc gaccaggccg agcacctgaa gaccgccgtg   540

cagatggccg tgttcatcca caacttcaag cgcaagggcg gcatcggcgg ctacagcgcc   600

ggcgagcgca tcatcgacat catcgccacc gacatccaga ccaaggagct gcagaagcag   660

atcatccgca tccagaactt ccgcgtgtac taccgcgaca gccgcgaccc catctggaag   720

ggccccgccg agctgctgtg gaagggcgag ggcgtggtgg tgatcgagga caagggcgac   780

atcaaggtgg tgccccgccg caaggccaag atcatccgcg actacggcaa gcagatggcc   840

ggcgccgact gcgtggccgg cggccaggac gaggac   876

<210> 61
<211> 876
<212> DNA
<213> Artificial

<220>
<223> HIV Type C p31Int Wild Type

<400> 61
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gtagctagct gtgataaatg tcagctaaaa ggggaagcca tacatggaca agtcgactgt   180

agtccaggga tatggcaatt agattgtacc catttagagg gaaaaatcat cctggtagca   240

gtccatgtag ctagtggcta catggaagca gaggttatcc cagcagaaac aggacaagaa   300

acagcatatt ttatattaaa attagcagga agatggccag tcaaagtaat acatacagac   360

aatggcagta attttaccag tactgcagtt aaggcagcct gttggtgggc aggtatccaa   420

caggaatttg gaattcccta caatccccaa agtcagggag tggtagaatc catgaataaa   480

gaattaaaga aaataatagg acaagtaaga gatcaagctg agcaccttaa gacagcagta   540

caaatggcag tattcattca caattttaaa agaaaagggg gaattggggg gtacagtgca   600

ggggaaagaa taatagacat aatagcaaca gacatacaaa ctaaagaatt acaaaaacaa   660

attataagaa ttcaaaattt tcgggtttat tacagagaca gcagagaccc tatttggaaa   720

ggaccagccg aactactctg gaaaggtgaa ggggtagtag taatagaaga taaaggtgac   780

ataaaggtag taccaaggag gaaagcaaaa atcattagag attatggaaa acagatggca   840

ggtgctgatt gtgtggcagg tggacaggat gaagat   876

<210> 62
<211> 3015
<212> DNA
<213> Artificial

<220>
<223> HIV Type C Pol Optimized

<400> 62
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acccgcgcca acagccccac cagccgcacc aacagcccca ccagccgcga gctgcaggtg   120

cgcggcgaca accccgcgc cgaggagggc gagcgcgagg gcaccttcaa cttcccccag   180

atcaccctgt ggcagcgccc cctggtgagc atcaaggtgg agggccagat caaggaggcc   240

ctgctggaca ccggcgccga cgacaccgtg ctggaggaga tcgacctgcc cggcaagtgg 300

aagcccaaga tgatcggcgg catcggcggc ttcatcaagg tgcgccagta cgaccagatc 360

ctgatcgaga tctgcggcaa gaaggccatc ggcaccgtgc tggtgggccc caccccgtg 420

aacatcatcg ccgcaacct gctgacccag ctgggctgca ccctgaactt ccccatcagc 480

cccatcgaga ccgtgcccgt gaagctgaag cccggcatgg acggccccaa ggtgaagcag 540

tggcccctga ccgaggagaa gatcaaggcc ctgaccgcca tctgcgagga gatggagaag 600

gagggcaaga tcaccaagat cggcccccgac aaccccctaca acaccccccgt gttcgccatc 660

aagaagaagg acagcaccaa gtggcgcaag ctggtggact ccgcgagct gaacaagcgc 720

acccaggact tctgggaggt gcagctgggc atcccccacc ccgccggcct gaagaagaag 780

aagagcgtga ccgtgctgga cgtgggcgac gcctacttca gcgtgcccct ggacgagagc 840

ttccgcaagt acaccgcctt caccatcccc agcatcaaca cgagacccc cggcatccgc 900

taccagtaca cgtgctgcc ccagggctgg aagggcagcc ccgccatctt ccagagcagc 960

atgaccaaga tcctggagcc cttccgcgcc aagaaccccg acatcgtgat ctaccagtac 1020

atggacgacc tgtacgtggg cagcgacctg gagatcggcc agcaccgcgc caagatcgag 1080

gagctgcgcg agcacctgct gaagtggggc ttcaccaccc ccgacaagaa gcaccagaag 1140

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gacctgatcg ccgagatcca gaagcagggc cacgagcagt ggacctacca gatctaccag 1500

gagcccttca gaacctgaa gaccggcaag tacgccaaga tgcgcaccac ccacaccaac 1560

gacgtgaagc agctgaccga ggccgtgcag aagatcgcca tggagagcat cgtgatctgg 1620

ggcaagaccc ccaagttccg cctgcccatc cagaaggaga cctgggagac ctggtggacc 1680

gactactggc aggccacctg gatccccgag tgggagttcg tgaacacccc ccccctggtg 1740

aagctgtggt accagctgga gaaggacccc atcgccggcg tggagacctt ctacgtggac 1800

ggcgccacca accgcgaggc caagatcggc aaggccggct acgtgaccga ccgcggccgc 1860

cagaagatcg tgaccctgac caacaccacc aaccagaaga ccgagctgca ggccatccag 1920

ctggccctgc aggacagcgg cagcgaggtg aacatcgtga ccgacagcca gtacgccctg 1980

ggcatcatcc aggcccagcc cgacaagagc gacagcgaga tcttcaacca gatcatcgag   2040

cagctgatca acaaggagcg catctacctg agctgggtgc ccgcccacaa gggcatcggc   2100

ggcaacgagc aggtggacaa gctggtgagc aagggcatcc gcaaggtgct gttcctggac   2160

ggcatcgaca aggcccagga ggagcacgag cgctaccaca gcaactggcg cgccatggcc   2220

aacgagttca acctgccccc catcgtggcc aaggagatcg tggccagctg cgacaagtgc   2280

cagctgaagg gcgaggccat ccacggccag gtggactgca gccccggcat ctggcagctg   2340

gactgcaccc acctggaggg caagatcatc ctggtggccg tgcacgtggc cagcggctac   2400

atggaggccg aggtgatccc cgccgagacc ggccaggaga ccgcctactt catcctgaag   2460

ctggccggcc gctggcccgt gaaggtgatc cacaccgaca acggcagcaa cttcaccagc   2520

accgccgtga aggccgcctg ctggtgggcc ggcatccagc aggagttcgg catcccctac   2580

aaccccccaga gccagggcgt ggtggagagc atgaacaagg agctgaagaa gatcatcggc   2640

caggtgcgcg accaggccga gcacctgaag accgccgtgc agatggccgt gttcatccac   2700

aacttcaagc gcaagggcgg catcggcggc tacagcgccg gcgagcgcat catcgacatc   2760

atcgccaccg acatccagac caaggagctg cagaagcaga tcatccgcat ccagaacttc   2820

cgcgtgtact accgcgacag ccgcgacccc atctggaagg gccccgccga gctgctgtgg   2880

aagggcgagg gcgtggtggt gatcgaggac aagggcgaca tcaaggtggt gccccgccgc   2940

aaggccaaga tcatccgcga ctacggcaag cagatggccg gcgccgactg cgtggccggc   3000

ggccaggacg aggac   3015

<210> 63
<211> 3015
<212> DNA
<213> Artificial

<220>
<223> HIV Type C Pol Wild Type

<400> 63
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accagagcca acagccccac cagcagaacc aacagcccca ccagcagaga gcttcaggtt   120

cgaggagaca accccgtgc cgaggaagga gaaagagagg gaacctttaa cttccctcaa   180

atcactcttt ggcagcgacc ccttgtctca ataaaagtag agggccagat aaaggaggct   240

ctcttagaca caggagcaga tgatacagta ttagaagaaa tagatttgcc agggaaatgg   300

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aaaccaaaaa tgatagggg aattggaggt tttatcaaag taagacagta tgatcaaata    360

cttatagaaa tttgtggaaa aaaggctata ggtacagtat tagtagggcc tacaccagtc    420

aacataattg gaagaaatct gttaactcag cttggatgca cactaaattt tccaattagt    480

cctattgaaa ctgtaccagt aaaattaaaa ccaggaatgg atggcccaaa ggtcaaacaa    540

tggccattga cagaagaaaa aataaaagca ttaacagcaa tttgtgagga aatggagaag    600

gaaggaaaaa ttacaaaaat tgggcctgat aatccatata acactccagt atttgccata    660

aaaaagaagg acagtactaa gtggagaaaa ttagtagatt tcagggaact caataaaaga    720

actcaagact tttgggaagt tcaattagga ataccacacc cagcaggatt aaaaaagaaa    780

aaatcagtga cagtgctaga tgtgggggat gcatatttt cagttccttt agatgaaagc    840

ttcaggaaat atactgcatt caccatacct agtataaaca atgaaacacc aggggattaga    900

tatcaatata atgtgctgcc acagggatgg aaaggatcac cagcaatatt ccagagtagc    960

atgacaaaaa tcttagagcc cttcagagca aaaaatccag acatagttat ctatcaatat   1020

atggatgact tgtatgtagg atctgactta gaaataggc aacatagagc aaaaatagaa   1080

gagttaaggg aacatttatt gaaatgggga tttacaacac cagacaagaa acatcaaaaa   1140

gaaccccat ttctttggat ggggtatgaa ctccatcctg acaaatggac agtacaacct   1200

atactgctgc cagaaaagga tagttggact gtcaatgata tacagaagtt agtgggaaaa   1260

ttaaactggg caagtcagat ttacccaggg attaaagtaa ggcaactctg taaactcctc   1320

aggggggcca aagcactaac agacatagta ccactaactg aagaagcaga attagaattg   1380

gcagagaaca gggaaattt aagagaacca gtacatggag tatattatga tccatcaaaa   1440

gacttgatag ctgaaataca gaaacagggg catgaacaat ggacatatca aatttatcaa   1500

gaaccattta aaatctgaa aacagggaag tatgcaaaaa tgaggactac ccacactaat   1560

gatgtaaaac agttaacaga ggcagtgcaa aaaatagcca tggaaagcat agtaatatgg   1620

ggaaagactc ctaaatttag actacccatc caaaaagaaa catgggagac atggtggaca   1680

gactattggc aagccacctg gattcctgag tgggagtttg ttaataccc tcccctagta   1740

aaattatggt accaactaga aaaagatccc atagcaggag tagaaacttt ctatgtagat   1800

ggagcaacta atagggaagc taaaatagga aaagcagggt atgttactga cagaggaagg   1860

cagaaaattg ttactctaac taacacaaca aatcagaaga ctgagttaca agcaattcag   1920

ctagctctgc aggattcagg atcagaagta aacatagtaa cagactcaca gtatgcatta   1980

ggaatcattc aagcacaacc agataagagt gactcagaga tatttaacca aataatagaa   2040
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67

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cagttaataa acaaggaaag aatctacctg tcatgggtac cagcacataa aggaattggg    2100

ggaaatgaac aagtagataa attagtaagt aagggaatta ggaaagtgtt gtttctagat    2160

ggaatagata aagctcaaga agagcatgaa aggtaccaca gcaattggag agcaatggct    2220

aatgagttta atctgccacc catagtagca aaagaaatag tagctagctg tgataaatgt    2280

cagctaaaag gggaagccat acatggacaa gtcgactgta gtccagggat atggcaatta    2340

gattgtaccc atttagaggg aaaaatcatc ctggtagcag tccatgtagc tagtggctac    2400

atggaagcag aggttatccc agcagaaaca ggacaagaaa cagcatattt tatattaaaa    2460

ttagcaggaa gatggccagt caaagtaata catacagaca atggcagtaa ttttaccagt    2520

actgcagtta aggcagcctg ttggtgggca ggtatccaac aggaatttgg aattccctac    2580

aatccccaaa gtcagggagt ggtagaatcc atgaataaag aattaaagaa aataatagga    2640

caagtaagag atcaagctga gcaccttaag acagcagtac aaatggcagt attcattcac    2700

aattttaaaa gaaaaggggg aattgggggg tacagtgcag gggaagaat aatagacata    2760

atagcaacag acatacaaac taaagaatta caaaaacaaa ttataagaat tcaaaatttt    2820

cgggtttatt acagagacag cagagaccct atttggaaag gaccagccga actactctgg    2880

aaaggtgaag gggtagtagt aatagaagat aaaggtgaca taaaggtagt accaaggagg    2940

aaagcaaaaa tcattagaga ttatggaaaa cagatggcag gtgctgattg tgtggcaggt    3000

ggacaggatg aagat                                                      3015


<210>   64
<211>   297
<212>   DNA
<213>   Artificial

<220>
<223>   HIV Type C Protease Optimized

<400>   64
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gaggccctgc tggacaccgg cgccgacgac accgtgctgg aggagatcga cctgcccggc     120

aagtggaagc ccaagatgat cggcggcatc ggcggcttca tcaaggtgcg ccagtacgac     180

cagatcctga tcgagatctg cggcaagaag gccatcggca ccgtgctggt gggcccacc      240

cccgtgaaca tcatcggccg caacctgctg acccagctgg gctgcaccct gaacttc        297


<210>   65
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68

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<211>  297
<212>  DNA
<213>  Artificial

<220>
<223>  HIV Type C Protease Wild Type

<400>  65
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gaggctctct tagacacagg agcagatgat acagtattag aagaaataga tttgccaggg     120

aaatggaaac caaaaatgat agggggaatt ggaggtttta tcaaagtaag acagtatgat     180

caaatactta tagaaatttg tggaaaaaag gctataggta cagtattagt agggcctaca     240

ccagtcaaca taattggaag aaatctgtta actcagcttg gatgcacact aaatttt       297


<210>  66
<211>  297
<212>  DNA
<213>  Artificial

<220>
<223>  HIV Type C Inactivated Protease Optimized

<400>  66
ccccagatca ccctgtggca gcgccccctg gtgagcatca aggtggaggg ccagatcaag      60

gaggccctgc tggccaccgg cgccgacgac accgtgctgg aggagatcga cctgcccggc     120

aagtggaagc ccaagatgat cggcggcatc ggcggcttca tcaaggtgcg ccagtacgac     180

cagatcctga tcgagatctg cggcaagaag gccatcggca ccgtgctggt gggcccccacc   240

cccgtgaaca tcatcggccg caacctgctg acccagctgg gctgcaccct gaacttc        297


<210>  67
<211>  297
<212>  DNA
<213>  Artificial

<220>
<223>  HIV Type C Inactivated Protease Wild Type

<400>  67
cctcaaatca ctctttggca gcgaccccctt gtctcaataa aagtagaggg ccagataaag      60

gaggctctct tagccacagg agcagatgat acagtattag aagaaataga tttgccaggg     120

aaatggaaac caaaaatgat agggggaatt ggaggtttta tcaaagtaag acagtatgat     180

caaatactta tagaaatttg tggaaaaaag gctataggta cagtattagt agggcctaca     240

ccagtcaaca taattggaag aaatctgtta actcagcttg gatgcacact aaatttt       297
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69

<210> 68
<211> 1965
<212> DNA
<213> Artificial

<220>
<223> HIV Type C Inactivated Protease Mutated Reverse Transcriptase
      Optimized

<400> 68
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gaggccctgc tggccaccgg cgccgacgac accgtgctgg aggagatcga cctgcccggc     120

aagtggaagc ccaagatgat cggcggcatc ggcggcttca tcaaggtgcg ccagtacgac     180

cagatcctga tcgagatctg cggcaagaag gccatcggca ccgtgctggt gggccccacc     240

cccgtgaaca tcatcggccg caacctgctg acccagctgg ctgcaccct gaacttcccc      300

atcagcccca tcgagaccgt gcccgtgaag ctgaagcccg gcatggacgg ccccaaggtg     360

aagcagtggc ccctgaccga ggagaagatc aaggccctga ccgccatctg cgaggagatg     420

gagaaggagg gcaagatcac caagatcggc cccgacaacc cctacaacac ccccgtgttc     480

gccatcaaga agaaggacag caccaagtgg cgcaagctgg tggacttccg cgagctgaac     540

aagcgcaccc aggacttctg ggaggtgcag ctgggcatcc cccaccccgc cggcctgaag     600

aagaagaaga gcgtgaccgt gctggacgtg ggcgacgcct acttcagcgt gcccctggac     660

gagagcttcc gcaagtacac cgccttcacc atccccagca tcaacaacga cccccccggc     720

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gagctgcgcg agcacctgct gaagtggggc ttcaccaccc ccgacaagaa gcaccagaag     960

gagccccccct cctgcccat cgagctgcac cccgacaagt ggaccgtgca gcccatcctg    1020

ctgcccgaga aggacagctg gaccgtgaac gacatccaga agctggtggg caagctgaac    1080

tgggccagcc agatctaccc cggcatcaag gtgcgccagc tgtgcaagct gctgcgcggc    1140

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atcgccgaga tccagaagca gggccacgag cagtggacct accagatcta ccaggagccc    1320

ttcaagaacc tgaagaccgg caagtacgcc aagatgcgca ccacccacac caacgacgtg    1380
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70

aagcagctga ccgaggccgt gcagaagatc gccatggaga gcatcgtgat ctggggcaag   1440

acccccaagt tccgcctgcc catccagaag gagacctggg agacctggtg gaccgactac   1500

tggcaggcca cctggatccc cgagtgggag ttcgtgaaca cccccccccct ggtgaagctg   1560

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accaaccgcg aggccaagat cggcaaggcc ggctacgtga ccgaccgcgg ccgccagaag   1680

atcgtgaccc tgaccaacac caccaaccag aagaccgagc tgcaggccat ccagctggcc   1740

ctgcaggaca gcggcagcga ggtgaacatc gtgaccgaca gccagtacgc cctgggcatc   1800

atccaggccc agcccgacaa gagcgacagc gagatcttca accagatcat cgagcagctg   1860

atcaacaagg agcgcatcta cctgagctgg gtgcccgccc acaagggcat cggcggcaac   1920

gagcaggtgg acaagctggt gagcaagggc atccgcaagg tgctg   1965

<210>   69
<211>   1965
<212>   DNA
<213>   Artificial

<220>
<223>   HIV Type C Inactivated Protease Mutated Reverse Transcriptase
        Wild Type

<400>   69
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gaggctctct tagccacagg agcagatgat acagtattag aagaaataga tttgccaggg   120

aaatggaaac caaaaatgat aggggaatt ggaggtttta tcaaagtaag acagtatgat   180

caaatactta tagaaatttg tggaaaaaag gctataggta cagtattagt agggcctaca   240

ccagtcaaca taattggaag aaatctgtta actcagcttg gatgcacact aaattttcca   300

attagtccta ttgaaactgt accagtaaaa ttaaaaccag gaatggatgg cccaaaggtc   360

aaacaatggc cattgacaga agaaaaaata aaagcattaa cagcaatttg tgaggaaatg   420

gagaaggaag gaaaaattac aaaaattggg cctgataatc catataacac tccagtattt   480

gccataaaaa agaaggacag tactaagtgg agaaaattag tagatttcag ggaactcaat   540

aaaagaactc aagacttttg ggaagttcaa ttaggaatac cacacccagc aggattaaaa   600

aagaaaaaat cagtgacagt gctagatgtg ggggatgcat attttttcagt tcctttagat   660

gaaagcttca ggaaatatac tgcattcacc atacctagta taaacaatga aacaccaggg   720

attagatatc aatataatgt gctgccacag ggatggaaag gatcaccagc aatattccag   780

71

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agtagcatga caaaaatctt agagcccttc agagcaaaaa atccagacat agttatctat     840

caagccccgt tgtatgtagg atctgactta gaaatagggc aacatagagc aaaaatagaa     900

gagttaaggg aacatttatt gaaatgggga tttacaacac cagacaagaa acatcaaaaa     960

gaaccccccat ttcttcccat cgaactccat cctgacaaat ggacagtaca acctatactg    1020

ctgccagaaa aggatagttg gactgtcaat gatatacaga agttagtggg aaaattaaac    1080

tgggcaagtc agatttaccc agggattaaa gtaaggcaac tctgtaaact cctcaggggg    1140

gccaaagcac taacagacat agtaccacta actgaagaag cagaattaga attggcagag    1200

aacagggaaa ttttaagaga accagtacat ggagtatatt atgatccatc aaaagacttg    1260

atagctgaaa tacagaaaca ggggcatgaa caatggacat atcaaattta tcaagaacca    1320

tttaaaaatc tgaaaacagg gaagtatgca aaaatgagga ctacccacac taatgatgta    1380

aaacagttaa cagaggcagt gcaaaaaata gccatggaaa gcatagtaat atggggaaag    1440

actcctaaat ttagactacc catccaaaaa gaaacatggg agacatggtg gacagactat    1500

tggcaagcca cctggatccc tgagtgggag tttgttaata cccctcccct agtaaaatta    1560

tggtaccaac tagaaaaaga tcccatagca ggagtagaaa ctttctatgt agatggagca    1620

actaataggg aagctaaaat aggaaaagca gggtatgtta ctgacagagg aaggcagaaa    1680

attgttactc taactaacac aacaaatcag aagactgagt tacaagcaat tcagctagct    1740

ctgcaggatt caggatcaga agtaaacata gtaacagact cacagtatgc attaggaatc    1800

attcaagcac aaccagataa gagtgactca gagatattta accaaataat agaacagtta    1860

ataaacaagg aaagaatcta cctgtcatgg gtaccagcac ataaaggaat tggggggaaat    1920

gaacaagtag ataaattagt aagtaaggga attaggaaag tgttg                     1965
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<210> 70
<211> 1977
<212> DNA
<213> Artificial

<220>
<223> HIV Type C Protease and Reverse Transcriptase Optimized

<400> 70
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ccccagatca ccctgtggca gcgcccctg gtgagcatca aggtggaggg ccagatcaag      60

gaggccctgc tggacaccgg cgccgacgac accgtgctgg aggagatcga cctgcccggc     120

aagtggaagc ccaagatgat cggcggcatc ggcggcttca tcaaggtgcg ccagtacgac     180
```

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cagatcctga tcgagatctg cggcaagaag gccatcggca ccgtgctggt gggcccaccc    240

cccgtgaaca tcatcggccg caacctgctg acccagctgg gctgcaccct gaacttccc    300

atcagcccca tcgagaccgt gcccgtgaag ctgaagcccg gcatggacgg ccccaaggtg    360

aagcagtggc ccctgaccga ggagaagatc aaggccctga ccgccatctg cgaggagatg    420

gagaaggagg gcaagatcac caagatcggc cccgacaacc cctacaacac ccccgtgttc    480

gccatcaaga agaaggacag caccaagtgg cgcaagctgg tggacttccg cgagctgaac    540

aagcgcaccc aggacttctg ggaggtgcag ctgggcatcc cccacccgc cggcctgaag    600

aagaagaaga gcgtgaccgt gctggacgtg ggcgacgcct acttcagcgt gcccctggac    660

gagagcttcc gcaagtacac cgccttcacc atccccagca tcaacaacga ccccccggc    720

atccgctacc agtacaacgt gctgccccag ggctggaagg cagccccgc catcttccag    780

agcagcatga ccaagatcct ggagcccttc cgcgccaaga acccgacat cgtgatctac    840

cagtacatgg acgacctgta cgtgggcagc gacctggaga tcggccagca ccgcgccaag    900

atcgaggagc tgcgcgagca cctgctgaag tggggcttca ccacccccga caagaagcac    960

cagaaggagc ccccttcct gtggatgggc tacgagctgc accccgacaa gtggaccgtg   1020

cagcccatcc tgctgcccga gaaggacagc tggaccgtga cgacatcca gaagctggtg   1080

ggcaagctga actgggccag ccagatctac cccggcatca aggtgcgcca gctgtgcaag   1140

ctgctgcgcg gcgccaaggc cctgaccgac atcgtgcccc tgaccgagga ggccgagctg   1200

gagctggccg agaaccgcga gatcctgcgc gagcccgtgc acggcgtgta ctacgacccc   1260

agcaaggacc tgatcgccga gatccagaag cagggccacg agcagtggac ctaccagatc   1320

taccaggagc ccttcaagaa cctgaagacc ggcaagtacg ccaagatgcg caccacccac   1380

accaacgacg tgaagcagct gaccgaggcc gtgcagaaga tcgccatgga gagcatcgtg   1440

atctggggca gaccccccaa gttccgcctg cccatccaga aggagacctg ggagacctgg   1500

tggaccgact actggcaggc cacctggatc cccgagtggg agttcgtgaa caccccccc   1560

ctggtgaagc tgtggtacca gctggagaag gaccccatcg ccggcgtgga gaccttctac   1620

gtggacggcg ccaccaaccg cgaggccaag atcggcaagg ccggctacgt gaccgaccgc   1680

ggccgccaga agatcgtgac cctgaccaac accaccaacc agaagaccga gctgcaggcc   1740

atccagctgg ccctgcagga cagcggcagc gaggtgaaca tcgtgaccga cagccagtac   1800

gccctgggca tcatccaggc ccagcccgac aagagcgaca gcgagatctt caaccagatc   1860

atcgagcagc tgatcaacaa ggagcgcatc tacctgagct gggtgcccgc ccacaagggc   1920
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73

atcggcggca acgagcaggt ggacaagctg gtgagcaagg gcatccgcaa ggtgctg   1977

<210> 71
<211> 1977
<212> DNA
<213> Artificial

<220>
<223> HIV Type C Protease and Reverse Transcriptase Wild Type

<400> 71
cctcaaatca ctctttggca gcgacccctt gtctcaataa aagtagaggg ccagataaag   60

gaggctctct tagacacagg agcagatgat acagtattag aagaaataga tttgccaggg   120

aaatggaaac caaaaatgat agggggaatt ggaggtttta tcaaagtaag acagtatgat   180

caaatactta tagaaatttg tggaaaaaag gctataggta cagtattagt agggcctaca   240

ccagtcaaca taattggaag aaatctgtta actcagcttg gatgcacact aaattttcca   300

attagtccta ttgaaactgt accagtaaaa ttaaaaccag gaatggatgg cccaaaggtc   360

aaacaatggc cattgacaga agaaaaaata aaagcattaa cagcaatttg tgaggaaatg   420

gagaaggaag gaaaaattac aaaaattggg cctgataatc catataacac tccagtattt   480

gccataaaaa agaaggacag tactaagtgg agaaaattag tagatttcag ggaactcaat   540

aaaagaactc aagacttttg ggaagttcaa ttaggaatac cacacccagc aggattaaaa   600

aagaaaaaat cagtgacagt gctagatgtg ggggatgcat attttтcagt tcctttagat   660

gaaagcttca ggaaatatac tgcattcacc atacctagta taaacaatga acaccaggg   720

attagatatc aatataatgt gctgccacag ggatggaaag gatcaccagc aatattccag   780

agtagcatga caaaaatctt agagcccttc agagcaaaaa atccagacat agttatctat   840

caatatatgg atgacttgta tgtaggatct gacttagaaa tagggcaaca tagagcaaaa   900

atagaagagt taagggaaca tttattgaaa tggggattta acacaccaga caagaaacat   960

caaaaagaac ccccatttct ttggatgggg tatgaactcc atcctgacaa atggacagta   1020

caacctatac tgctgccaga aaaggatagt tggactgtca atgatataca gaagttagtg   1080

ggaaaattaa actgggcaag tcagatttac ccagggatta agtaaggca actctgtaaa   1140

ctcctcaggg gggccaaagc actaacagac atagtaccac taactgaaga agcagaatta   1200

gaattggcag agaacaggga attttaaga gaaccagtac atggagtata ttatgatcca   1260

tcaaaagact tgatagctga aatacagaaa cagggcatg aacaatggac atatcaaatt   1320

74

```
tatcaagaac catttaaaaa tctgaaaaca gggaagtatg caaaaatgag gactacccac   1380

actaatgatg taaaacagtt aacagaggca gtgcaaaaaa tagccatgga aagcatagta   1440

atatgggggaa agactcctaa atttagacta cccatccaaa aagaaacatg ggagacatgg   1500

tggacagact attggcaagc cacctggatc cctgagtggg agtttgttaa taccccctccc   1560

ctagtaaaat tatggtacca actagaaaaa gatcccatag caggagtaga aactttctat   1620

gtagatggag caactaatag ggaagctaaa ataggaaaag cagggtatgt tactgacaga   1680

ggaaggcaga aaattgttac tctaactaac acaacaaatc agaagactga gttacaagca   1740

attcagctag ctctgcagga ttcaggatca gaagtaaaca tagtaacaga ctcacagtat   1800

gcattaggaa tcattcaagc acaaccagat aagagtgact cagagatatt taaccaaata   1860

atagaacagt taataaacaa ggaaagaatc tacctgtcat gggtaccagc acataaagga   1920

attgggggaa atgaacaagt agataaatta gtaagtaagg gaattaggaa agtgttg      1977
```

<210>   72
<211>   75
<212>   DNA
<213>   Artificial

<220>
<223>   HIV Type C RevExon1 Optimized

<400>   72
```
atggccggcc gcagcggcga cagcgacgag gccctgctgc aggtggtgaa gatcatcaag   60

atcctgtacc agagc                                                    75
```

<210>   73
<211>   76
<212>   DNA
<213>   Artificial

<220>
<223>   HIV Type C RevExon1 Wild Type

<400>   73
```
atggcaggaa gaagcggaga cagcgacgaa gcgctcctcc aagtggtgaa gatcatcaaa   60

atcctctatc aaagca                                                   76
```

<210>   74
<211>   246
<212>   DNA
<213>   Artificial

<220>

<223> HIV Type C RevExon2 Optimized

<400> 74
ccctaccccca agcccgaggg cacccgccag gcccgccgca accgccgccg ccgctggcgc   60

gcccgccagc gccagatcca caccatcggc gagcgcatcc tggtggcctg cctgggccgc   120

agcgccgagc ccgtgcccct gcagctgccc ccctggagc gcctgcacat caactgcagc   180

gagggcagcg gcaccagcgg cacccagcag agccagggca ccaccgaggg cgtgggcgac   240

ccctaa   246

<210> 75
<211> 248
<212> DNA
<213> Artificial

<220>
<223> HIV Type C RevExon2 Wild Type

<400> 75
acccttaccc caagcccgag gggactcgac aggctcggag gaatcgaaga agaaggtgga   60

gagcaagaca gagacagatc catacgattg gtgagcggat tcttgtcgct tgcctgggac   120

gatctgcgga gcctgtgcct cttcagctac caccgcttga gagacttcat attaattgca   180

gtgagggcag tggaacttct gggacacagc agtctcaggg gactacagag ggggtgggag   240

atccttaa   248

<210> 76
<211> 1680
<212> DNA
<213> Artificial

<220>
<223> HIV Type C Reverse Transcriptase Optimized

<400> 76
cccatcagcc ccatcgagac cgtgcccgtg aagctgaagc ccggcatgga cggcccccaag   60

gtgaagcagt ggcccctgac cgaggagaag atcaaggccc tgaccgccat ctgcgaggag   120

atggagaagg agggcaagat caccaagatc ggccccgaca acccctacaa caccccccgtg   180

ttcgccatca gaagaagga cagcaccaag tggcgcaagc tggtggactt ccgcgagctg   240

aacaagcgca cccaggactt ctgggaggtg cagctgggca tcccccaccc cgccggcctg   300

aagaagaaga agagcgtgac cgtgctggac gtgggcgacg cctacttcag cgtgccctg   360

gacgagagct ccgcaagta caccgccttc accatccca gcatcaacaa cgagacccccc   420

76

```
ggcatccgct accagtacaa cgtgctgccc cagggctgga agggcagccc cgccatcttc    480

cagagcagca tgaccaagat cctggagccc ttccgcgcca agaaccccga catcgtgatc    540

taccagtaca tggacgacct gtacgtgggc agcgacctgg agatcggcca gcaccgcgcc    600

aagatcgagg agctgcgcga gcacctgctg aagtggggct tcaccacccc cgacaagaag    660

caccagaagg agcccccctt cctgtggatg ggctacgagc tgcaccccga caagtggacc    720

gtgcagccca tcctgctgcc cgagaaggac agctggaccg tgaacgacat ccagaagctg    780

gtgggcaagc tgaactgggc cagccagatc taccccggca tcaaggtgcg ccagctgtgc    840

aagctgctgc gcggcgccaa ggccctgacc gacatcgtgc ccctgaccga ggaggccgag    900

ctggagctgg ccgagaaccg cgagatcctg cgcgagcccg tgcacggcgt gtactacgac    960

cccagcaagg acctgatcgc cgagatccag aagcagggcc acgagcagtg gacctaccag   1020

atctaccagg agcccttcaa gaacctgaag accggcaagt acgccaagat cgcgcaccacc   1080

cacaccaacg acgtgaagca gctgaccgag gccgtgcaga agatcgccat ggagagcatc   1140

gtgatctggg gcaagacccc caagttccgc ctgcccatcc agaaggagac ctgggagacc   1200

tggtggaccg actactggca ggccacctgg atccccgagt gggagttcgt gaacacccccc   1260

cccctggtga gctgtggta ccagctggag aaggaccccca tcgccggcgt ggagaccttc   1320

tacgtggacg cgccaccaa ccgcgaggcc aagatcggca aggccggcta cgtgaccgac   1380

cgcggccgcc agaagatcgt gaccctgacc aacaccacca accagaagac cgagctgcag   1440

gccatccagc tggccctgca ggacagcggc agcgaggtga acatcgtgac cgacagccag   1500

tacgccctgg gcatcatcca ggcccagccc gacaagagcg acagcgagat cttcaaccag   1560

atcatcgagc agctgatcaa caaggagcgc atctacctga gctgggtgcc cgcccacaag   1620

ggcatcggcg gcaacgagca ggtggacaag ctggtgagca agggcatccg caaggtgctg   1680
```

<210>   77
<211>   1680
<212>   DNA
<213>   Artificial

<220>
<223>   HIV Type C Reverse Transcriptase Wild Type

<400>   77
```
ccaattagtc ctattgaaac tgtaccagta aaattaaaac caggaatgga tggcccaaag     60

gtcaaacaat ggccattgac agaagaaaaa ataaaagcat taacagcaat ttgtgaggaa    120

atggagaagg aaggaaaaat tacaaaaatt gggcctgata atccatataa cactccagta    180
```

77

```
tttgccataa aaaagaagga cagtactaag tggagaaaat tagtagattt cagggaactc    240

aataaaagaa ctcaagactt ttgggaagtt caattaggaa taccacaccc agcaggatta    300

aaaaagaaaa aatcagtgac agtgctagat gtggggatg catattttc agttcctta      360

gatgaaagct tcaggaaata tactgcattc accataccta gtataaacaa tgaaacacca    420

gggattagat atcaatataa tgtgctgcca cagggatgga aaggatcacc agcaatattc    480

cagagtagca tgacaaaaat cttagagccc ttcagagcaa aaaatccaga catagttatc    540

tatcaatata tggatgactt gtatgtagga tctgacttag aaatagggca acatagagca    600

aaaatagaag agttaaggga acatttattg aaatggggat ttacaacacc agacaagaaa    660

catcaaaaag aaccccatt tctttggatg gggtatgaac tccatcctga caaatggaca    720

gtacaaccta tactgctgcc agaaaaggat agttggactg tcaatgatat acagaagtta    780

gtgggaaaat taaactgggc aagtcagatt tacccaggga ttaaagtaag gcaactctgt    840

aaactcctca gggggccaa agcactaaca gacatagtac cactaactga agaagcagaa     900

ttagaattgg cagagaacag ggaaatttta agagaaccag tacatggagt atattatgat    960

ccatcaaaag acttgatagc tgaaatacag aaacagggc atgaacaatg gacatatcaa    1020

atttatcaag aaccatttaa aaatctgaaa acaggaagt atgcaaaaat gaggactacc    1080

cacactaatg atgtaaaaca gttaacagag gcagtgcaaa aaatagccat ggaaagcata    1140

gtaatatggg gaaagactcc taaatttaga ctacccatcc aaaaagaaac atgggagaca    1200

tggtggacag actattggca agccacctgg atccctgagt gggagtttgt taataccct    1260

cccctagtaa aattatggta ccaactagaa aaagatccca tagcaggagt agaaactttc    1320

tatgtagatg gagcaactaa tagggaagct aaaataggaa aagcagggta tgttactgac    1380

agaggaaggc agaaaattgt tactctaact aacacaacaa atcagaagac tgagttacaa    1440

gcaattcagc tagctctgca ggattcagga tcagaagtaa acatagtaac agactcacag    1500

tatgcattag gaatcattca agcacaacca gataagagtg actcagagat atttaaccaa    1560

ataatagaac agttaataaa caaggaaaga atctacctgt catgggtacc agcacataaa    1620

ggaattgggg gaaatgaaca agtagataaa ttagtaagta agggaattag gaaagtgttg    1680
```

<210> 78
<211> 1668
<212> DNA
<213> Artificial

78

<220>
<223> HIV Type C Mutated Reverse Transcriptase Optimized

<400> 78
cccatcagcc ccatcgagac cgtgcccgtg aagctgaagc ccggcatgga cggccccaag   60

gtgaagcagt ggcccctgac cgaggagaag atcaaggccc tgaccgccat ctgcgaggag   120

atggagaagg agggcaagat caccaagatc ggccccgaca cccctacaa caccccgtg   180

ttcgccatca gaagaagga cagcaccaag tggcgcaagc tggtggactt ccgcgagctg   240

aacaagcgca cccaggactt ctgggaggtg cagctgggca tcccccaccc cgccggcctg   300

aagaagaaga agagcgtgac cgtgctggac gtgggcgacg cctacttcag cgtgcccctg   360

gacgagagct ccgcaagta caccgccttc accatcccca gcatcaacaa cgagaccccc   420

ggcatccgct accagtacaa cgtgctgccc cagggctgga agggcagccc cgccatcttc   480

cagagcagca tgaccaagat cctggagccc ttccgcgcca gaaccccga catcgtgatc   540

taccaggccc ccctgtacgt gggcagcgac ctggagatcg ccagcaccg cgccaagatc   600

gaggagctgc gcgagcacct gctgaagtgg ggcttcacca cccccgacaa gaagcaccag   660

aaggagcccc ccttcctgcc catcgagctg cacccccgaca agtggaccgt gcagcccatc   720

ctgctgcccg agaaggacag ctggaccgtg aacgacatcc agaagctggt gggcaagctg   780

aactgggcca gccagatcta ccccggcatc aaggtgcgcc agctgtgcaa gctgctgcgc   840

ggcgccaagg ccctgaccga catcgtgccc ctgaccgagg aggccgagct ggagctggcc   900

gagaaccgcg agatcctgcg cgagcccgtg cacggcgtgt actacgaccc cagcaaggac   960

ctgatcgccg agatccagaa gcagggccac gagcagtgga cctaccagat ctaccaggag   1020

cccttcaaga acctgaagac cggcaagtac gccaagatgc gcaccaccca caccaacgac   1080

gtgaagcagc tgaccgaggc cgtgcagaag atcgccatgg agagcatcgt gatctggggc   1140

aagacccca agttccgcct gcccatccag aaggagacct gggagacctg gtggaccgac   1200

tactggcagg ccacctggat ccccgagtgg gagttcgtga cacccccccc cctggtgaag   1260

ctgtggtacc agctggagaa ggaccccatc gccggcgtgg agaccttcta cgtggacggc   1320

gccaccaacc gcgaggccaa gatcggcaag gccggctacg tgaccgaccg cggccgccag   1380

aagatcgtga ccctgaccaa caccaccaac cagaagaccg agctgcaggc catccagctg   1440

gccctgcagg acagcggcag cgaggtgaac atcgtgaccg acagccagta cgccctgggc   1500

atcatccagg cccagcccga caagagcgac agcgagatct tcaaccagat catcgagcag   1560

ctgatcaaca aggagcgcat ctacctgagc tgggtgcccg cccacaaggg catcggcggc   1620

```
aacgagcagg tggacaagct ggtgagcaag ggcatccgca aggtgctg                 1668


<210>   79
<211>   1668
<212>   DNA
<213>   Artificial

<220>
<223>   HIV Type C Mutated Reverse Transcriptase Wild Type

<400>   79
ccaattagtc ctattgaaac tgtaccagta aaattaaaac caggaatgga tggcccaaag    60

gtcaaacaat ggccattgac agaagaaaaa ataaaagcat taacagcaat ttgtgaggaa   120

atggagaagg aaggaaaaat tacaaaaatt gggcctgata atccatataa cactccagta   180

tttgccataa aaaagaagga cagtactaag tggagaaaat tagtagattt cagggaactc   240

aataaaagaa ctcaagactt ttgggaagtt caattaggaa taccacaccc agcaggatta   300

aaaaagaaaa aatcagtgac agtgctagat gtggggatg catattttc agttcctta    360

gatgaaagct tcaggaaata tactgcattc accataccta gtataaacaa tgaaacacca   420

gggattagat atcaatataa tgtgctgcca cagggatgga aaggatcacc agcaatattc   480

cagagtagca tgacaaaaat cttagagccc ttcagagcaa aaaatccaga catagttatc   540

tatcaagccc cgttgtatgt aggatctgac ttagaaatag ggcaacatag agcaaaaata   600

gaagagttaa gggaacattt attgaaatgg ggatttacaa caccagacaa gaaacatcaa   660

aaagaacccc catttcttcc catcgaactc catcctgaca aatggacagt acaacctata   720

ctgctgccag aaaaggatag ttggactgtc aatgatatac agaagttagt gggaaaatta   780

aactgggcaa gtcagattta cccagggatt aaagtaaggc aactctgtaa actcctcagg   840

ggggccaaag cactaacaga catagtacca ctaactgaag aagcagaatt agaattggca   900

gagaacaggg aaattttaag agaaccagta catggagtat attatgatcc atcaaaagac   960

ttgatagctg aaatacagaa acaggggcat gaacaatgga catatcaaat ttatcaagaa  1020

ccatttaaaa atctgaaaac agggaagtat gcaaaaatga ggactaccca cactaatgat  1080

gtaaaacagt taacagaggc agtgcaaaaa atagccatgg aaagcatagt aatatgggga  1140

aagactccta aatttagact acccatccaa aaagaaacat gggagacatg gtggacagac  1200

tattggcaag ccacctggat ccctgagtgg gagtttgtta atacccctcc cctagtaaaa  1260

ttatggtacc aactagaaaa agatcccata gcaggagtag aaactttcta tgtagatgga  1320
```

80

```
gcaactaata gggaagctaa aataggaaaa gcagggtatg ttactgacag aggaaggcag    1380

aaaattgtta ctctaactaa cacaacaaat cagaagactg agttacaagc aattcagcta    1440

gctctgcagg attcaggatc agaagtaaac atagtaacag actcacagta tgcattagga    1500

atcattcaag cacaaccaga taagagtgac tcagagatat ttaaccaaat aatagaacag    1560

ttaataaaca aggaaagaat ctacctgtca tgggtaccag cacataaagg aattggggga    1620

aatgaacaag tagataaatt agtaagtaag ggaattagga aagtgttg                 1668
```

<210> 80
<211> 216
<212> DNA
<213> Artificial

<220>
<223> HIV Type C TatC22Exon1 Optimized

<400> 80
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atggagcccg tggaccccaa gctgaagccc tggaaccacc ccggcagcca gcccaagacc      60

gccggcaaca actgcttctg caagcactgc agctaccact gcctggtgtg cttccagacc     120

aagggcctgg gcatcagcta cggccgcaag aagcgccgcc agcgccgcag cgcccccccc     180

agcggcgagg accaccagaa ccccctgagc aagcag                               216
```

<210> 81
<211> 216
<212> DNA
<213> Artificial

<220>
<223> HIV Type C TatExon1 Optimized

<400> 81
```
atggagcccg tggaccccaa gctgaagccc tggaaccacc ccggcagcca gcccaagacc      60

gcctgcaaca actgcttctg caagcactgc agctaccact gcctggtgtg cttccagacc     120

aagggcctgg gcatcagcta cggccgcaag aagcgccgcc agcgccgcag cgcccccccc     180

agcggcgagg accaccagaa ccccctgagc aagcag                               216
```

<210> 82
<211> 216
<212> DNA
<213> Artificial

<220>
<223> HIV Type C TatExon1 Wild Type
```

<400> 82
atggagccag tagatcctaa actaaagccc tggaaccatc caggaagcca acctaaaaca      60

gcttgtaata attgcttttg caaacactgt agctatcatt gtctagtttg ctttcagaca     120

aaaggtttag gcatttccta tggcaggaag aagcggagac agcgacgaag cgctcctcca     180

agtggtgaag atcatcaaaa tcctctatca aagcag                              216


<210>  83
<211>  93
<212>  DNA
<213>  Artificial

<220>
<223>  HIV Type C TatExon2 Optimized

<400>  83
cccctgcccc aggcccgcgg cgacagcacc ggcagcgagg agagcaagaa gaaggtggag      60

agcaagaccg agaccgaccc ctacgactgg tga                                  93


<210>  84
<211>  93
<212>  DNA
<213>  Artificial

<220>
<223>  HIV Type C TatExon2 Wild Type

<400>  84
cccttacccc aagcccgagg ggactcgaca ggctcggagg aatcgaagaa gaaggtggag      60

agcaagacag agacagatcc atacgattgg tga                                  93


<210>  85
<211>  579
<212>  DNA
<213>  Artificial

<220>
<223>  HIV Type C Vif Optimized

<400>  85
atggagaacc gctggcaggt gctgatcgtg tggcaggtgg accgcatgaa gatccgcgcc      60

tggaacagcc tggtgaagca ccacatgtac atcagccgcc gcgccagcgg ctgggtgtac     120

cgccaccact tcgagagccg ccaccccaag gtgagcagcg aggtgcacat ccccctgggc     180

gacgcccgcc tggtgatcaa gacctactgg ggcctgcaga ccggcgagcg cgactggcac     240

ctgggccacg gcgtgagcat cgagtggcgc ctgcgcgagt acagcaccca ggtggacccc     300

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gacctggccg accagctgat ccacatgcac tacttcgact gcttcaccga gagcgccatc      360

cgccaggcca tcctgggcca catcgtgttc ccccgctgcg actaccaggc cggccacaag      420

aaggtgggca gcctgcagta cctggccctg accgccctga tcaagcccaa gaagcgcaag      480

ccccccctgc ccagcgtgcg caagctggtg gaggaccgct ggaacgaccc ccagaagacc      540

cgcggccgcc gcggcaacca caccatgaac ggccactag                             579


<210>   86
<211>   579
<212>   DNA
<213>   Artificial

<220>
<223>   HIV Type C Vif Wild Type

<400>   86
atggaaaaca gatggcaggt gctgattgtg tggcaggtgg acaggatgaa gattagagca       60

tggaatagtt tagtaaagca ccatatgtat atatcaagga gagctagtgg atgggtctac      120

agacatcatt ttgaaagcag acatccaaaa gtaagttcag aagtacatat cccattaggg      180

gatgctagat tagtaataaa aacatattgg ggtttgcaga caggagaaag agattggcat      240

ttgggtcatg gagtctccat agaatggaga ctgagagaat acagcacaca agtagaccct      300

gacctggcag accagctaat tcacatgcat tattttgatt gttttacaga atctgccata      360

agacaagcca tattaggaca catagttttt cctaggtgtg actatcaagc aggacataag      420

aaggtaggat ctctgcaata cttggcactg acagcattga taaaaccaaa aaagagaaag      480

ccacctctgc ctagtgttag aaaattagta gaggatagat ggaacgaccc ccagaagacc      540

aggggccgca gagggaacca tacaatgaat ggacactag                             579


<210>   87
<211>   288
<212>   DNA
<213>   Artificial

<220>
<223>   HIV Type C Vpr   Optimized

<400>   87
atggagcgcc cccccgagga ccagggcccc cagcgcgagc cctacaacga gtggaccctg       60

gagatcctgg aggagctgaa gcaggaggcc gtgcgccact cccccgccc ctggctgcac       120

agcctgggcc agtacatcta cgagacctac ggcgacacct ggaccggcgt ggaggccatc      180

atccgcgtgc tgcagcagct gctgttcatc cacttccgca tcggctgcca gcacagccgc      240
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83

atcggcatcc tgcgccagcg ccgcgcccgc aacggcgcca gccgcagc   288

<210>   88
<211>   288
<212>   DNA
<213>   Artificial

<220>
<223>   HIV Type C Vpr Wild Type

<400>   88
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gagattctag aagaactcaa gcaggaagct gtcagacact ttcctagacc atggctccat   120

agcttaggac aatatatcta tgaaacctat ggggatactt ggacgggagt tgaagctata   180

ataagagtac tgcaacaact actgttcatt catttcagaa ttggatgcca acatagcaga   240

ataggcatct tgcgacagag aagagcaaga aatggagcca gtagatcc   288

<210>   89
<211>   267
<212>   DNA
<213>   Artificial

<220>
<223>   HIV Type C Vpu   Optimized

<400>   89
atggtgagcc tgagcctgtt caagggcgtg gactaccgcc tgggcgtggg cgccctgatc   60

gtggccctga tcatcgccat catcgtgtgg accatcgcct acatcgagta ccgcaagctg   120

gtgcgccaga agaagatcga ctggctgatc aagcgcatcc gcgagcgcgc cgaggacagc   180

ggcaacgaga gcgacggcga caccgaggag ctgagcacca tggtggacat gggccacctg   240

cgcctgctgg acgccaacga cctgtaa   267

<210>   90
<211>   267
<212>   DNA
<213>   Artificial

<220>
<223>   HIV Type C Vpu Wild Type

<400>   90
atggtaagtt taagtttatt taaaggagta gattatagat taggagtagg agcattgata   60

gtagcactaa tcatagcaat aatagtgtgg accatagcat atatagaata taggaaattg   120

84

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gtaagacaaa agaaaataga ctggttaatt aaaagaatta gggaaagagc agaagacagt      180

ggcaatgaga gtgatgggga cacagaagaa ttgtcaacaa tggtggatat ggggcatctt      240

aggcttctgg atgctaatga tttgtaa                                          267


<210>  91
<211>  321
<212>  DNA
<213>  Artificial

<220>
<223>  HIV Type C RevExon 1 and 2 Optimized

<400>  91
atggccggcc gcagcggcga cagcgacgag gccctgctgc aggtggtgaa gatcatcaag       60

atcctgtacc agagccccta ccccaagccc gagggcaccc gccaggcccg ccgcaaccgc      120

cgccgccgct ggcgcgcccg ccagcgccag atccacacca tcggcgagcg catcctggtg      180

gcctgcctgg ccgcagcgc cgagcccgtg cccctgcagc tgcccccccct ggagcgcctg      240

cacatcaact gcagcgaggg cagcggcacc agcggcaccc agcagagcca gggcaccacc      300

gagggcgtgg gcgacccta a                                                 321


<210>  92
<211>  324
<212>  DNA
<213>  Artificial

<220>
<223>  HIV Type C RevExon 1 and 2 Wild Type

<400>  92
atggcaggaa gaagcggaga cagcgacgaa gcgctcctcc aagtggtgaa gatcatcaaa       60

atcctctatc aaagcaaccc ttaccccaag cccgagggga ctcgacaggc tcggaggaat      120

cgaagaagaa ggtggagagc aagacagaga cagatccata cgattggtga gcggattctt      180

gtcgcttgcc tgggacgatc tgcggagcct gtgcctcttc agctaccacc gcttgagaga      240

cttcatatta attgcagtga gggcagtgga acttctggga cacagcagtc tcaggggact      300

acagaggggg tgggagatcc ttaa                                             324


<210>  93
<211>  309
<212>  DNA
<213>  Artificial

<220>
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<223> HIV Type C TatC22 Exon 1 and 2 Optimized

<400> 93
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atggagcccg tggaccccaa gctgaagccc tggaaccacc ccggcagcca gcccaagacc      60

gccggcaaca actgcttctg caagcactgc agctaccact gcctggtgtg cttccagacc     120

aagggcctgg gcatcagcta cggccgcaag aagcgccgcc agcgccgcag cgccccccccc    180

agcggcgagg accaccagaa cccccctgagc aagcagcccc tgccccaggc ccgcggcgac    240

agcaccggca gcgaggagag caagaagaag gtggagagca agaccgagac cgacccctac    300

gactggtga                                                             309
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<210> 94
<211> 309
<212> DNA
<213> Artificial

<220>
<223> HIV Type C Tat Exon 1 and 2 Optimized

<400> 94
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atggagcccg tggaccccaa gctgaagccc tggaaccacc ccggcagcca gcccaagacc      60

gcctgcaaca actgcttctg caagcactgc agctaccact gcctggtgtg cttccagacc     120

aagggcctgg gcatcagcta cggccgcaag aagcgccgcc agcgccgcag cgccccccccc    180

agcggcgagg accaccagaa cccccctgagc aagcagcccc tgccccaggc ccgcggcgac    240

agcaccggca gcgaggagag caagaagaag gtggagagca agaccgagac cgacccctac    300

gactggtga                                                             309
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<210> 95
<211> 309
<212> DNA
<213> Artificial

<220>
<223> HIV Type C Tat Exon 1 and 2 Wild Type

<400> 95
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gcttgtaata attgcttttg caaacactgt agctatcatt gtctagtttg ctttcagaca     120

aaaggtttag gcatttccta tggcaggaag aagcggagac agcgacgaag cgctcctcca    180

agtggtgaag atcatcaaaa tcctctatca aagcagccct accccaagc ccgaggggac     240

tcgacaggct cggaggaatc gaagaagaag gtggagagca agacagagac agatccatac    300
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86

```
gattggtga                                                                                     309


<210>  96
<211>  624
<212>  DNA
<213>  Artificial

<220>
<223>  HIV  Type  C  NefD125g  Optimized   Myristalization  Modification

<400>  96
atggccggca agtggagcaa gcgcagcatc gtgggctggc ccgccgtgcg cgagcgcatg      60

cgccgcaccg agcccgccgc cgagggcgtg ggcgccgcca gccaggacct ggaccgccac     120

ggcgccctga ccagcagcaa cacccccgcc accaacgagg cctgcgcctg gctgcaggcc     180

caggaggagg acggcgacgt gggcttcccc gtgcgccccc aggtgcccct cgcccccatg     240

acctacaaga gcgccgtgga cctgagcttc ttcctgaagg agaagggcgg cctggagggc     300

ctgatctaca gccgcaagcg ccaggagatc ctggacctgt gggtgtacaa cacccagggc     360

ttcttccccg gctggcagaa ctacaccagc ggccccggcg tgcgcttccc cctgaccttc     420

ggctggtgct tcaagctggt gcccgtggac ccccgcgagg tgaaggaggc caacgagggc     480

gaggacaact gcctgctgca ccccatgagc cagcacggcg ccgaggacga ggaccgcgag     540

gtgctgaagt ggaagttcga cagcctgctg gcccaccgcc acatggcccg cgagctgcac     600

cccgagtact acaaggactg ctga                                           624


<210>  97
<211>  2565
<212>  DNA
<213>  Artificial

<220>
<223>  Envgp160_TV2_C_ZAopt

<400>  97
atgcgcgccc gcggcatcct gaagaactac cgccactggt ggatctgggg catcctgggc      60

ttctggatgc tgatgatgtg caacgtgaag ggcctgtggg tgaccgtgta ctacggcgtg     120

cccgtgggcc gcgaggccaa gaccaccctg ttctgcgcca gcgacgccaa ggcctacgag     180

aaggaggtgc acaacgtgtg gccacccac gcctgcgtgc ccaccgaccc caacccccag     240

gaggtgatcc tgggcaacgt gaccgagaac ttcaacatgt ggaagaacga catggtggac     300

cagatgcagg aggacatcat cagcctgtgg gaccagagcc tgaagccctg cgtgaagctg     360

acccccctgt gcgtgaccct gaactgcacc aacgccaccg tgaactacaa caacaccagc     420
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87

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aaggacatga agaactgcag cttctacgtg accaccgagc tgcgcgacaa gaagaagaag      480

gagaacgccc tgttctaccg cctggacatc gtgcccctga acaaccgcaa gaacggcaac      540

atcaacaact accgcctgat caactgcaac accagcgcca tcacccaggc ctgccccaag      600

gtgagcttcg accccatccc catccactac tgcgcccccg ccggctacgc ccccctgaag      660

tgcaacaaca agaagttcaa cggcatcggc ccctgcgaca acgtgagcac cgtgcagtgc      720

acccacggca tcaagcccgt ggtgagcacc cagctgctgc tgaacggcag cctggccgag      780

gaggagatca tcatccgcag cgagaacctg accaacaacg tgaagaccat catcgtgcac      840

ctgaacgaga gcatcgagat caagtgcacc cgccccggca acaacacccg caagagcgtg      900

cgcatcggcc ccggccaggc cttctacgcc accggcgaca tcatcggcga catccgccag      960

gcccactgca acatcagcaa gaacgagtgg aacaccaccc tgcagcgcgt gagccagaag     1020

ctgcaggagc tgttccccaa cagcaccggc atcaagttcg ccccccacag cggcggcgac     1080

ctggagatca ccacccacag cttcaactgc ggcggcgagt tcttctactg caacaccacc     1140

gacctgttca acagcaccta cagcaacggc acctgcacca acggcacctg catgagcaac     1200

aacaccgagc gcatcaccct gcagtgccgc atcaagcaga tcatcaacat gtggcaggag     1260

gtgggccgcg ccatgtacgc ccccccatc gccggcaaca tcacctgccg cagcaacatc     1320

accggcctgc tgctgacccg cgacggcggc gacaacaaca ccgagaccga gaccttccgc     1380

cccggcggcg gcgacatgcg cgacaactgg cgcagcgagc tgtacaagta caaggtggtg     1440

gagatcaagc ccctgggcgt ggcccccacc gccgccaagc gccgcgtggt ggagcgcgag     1500

aagcgcgccg tgggcatcgg cgccgtgttc ctgggcttcc tgggcgccgc cggcagcacc     1560

atgggcgccg ccagcatcac cctgaccgtg caggcccgcc agctgctgag cggcatcgtg     1620

cagcagcaga gcaacctgct gcgcgccatc gaggcccagc agcacatgct gcagctgacc     1680

gtgtggggca tcaagcagct gcaggcccgc gtgctggcca tcgagcgcta cctgcaggac     1740

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tggaacagca gctggagcaa caagacccag agcgacatct gggacaacat gacctggatg     1860

cagtgggacc gcgagatcag caactacacc aacaccatct accgcctgct ggaggacagc     1920

cagagccagc aggagcgcaa cgagaaggac ctgctggccc tggaccgctg gaacaacctg     1980

tggaactggt tcagcatcac caactggctg tggtacatca agatcttcat catgatcgtg     2040

ggcggcctga tcggcctgcg catcatcttc gccgtgctga gcctggtgaa ccgcgtgcgc     2100
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88

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cagggctaca gcccccctgag cctgcagacc ctgatcccca accccgcgg ccccgaccgc    2160

ctgggcggca tcgaggagga gggcggcgag caggacagca gccgcagcat ccgcctggtg    2220

agcggcttcc tgaccctggc ctgggacgac ctgcgcagcc tgtgcctgtt ctgctaccac    2280

cgcctgcgcg acttcatcct gatcgtggtg cgcgccgtgg agctgctggg ccacagcagc    2340

ctgcgcggcc tgcagcgcgg ctggggcacc ctgaagtacc tgggcagcct ggtgcagtac    2400

tggggcctgg agctgaagaa gagcgccatc aacctgctgg acaccatcgc catcgccgtg    2460

gccgagggca ccgaccgcat cctggagttc atccagaacc tgtgccgcgg catccgcaac    2520

gtgccccgcc gcatccgcca gggcttcgag gccgccctgc agtaa               2565


<210>   98
<211>   2565
<212>   DNA
<213>   Artificial

<220>
<223>   Envgp160_TV2_C_ZAwt

<400>   98
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ttttggatgc taatgatgtg taatgtgaag ggcttgtggg tcacagtcta ctacggggta    120

cctgtgggga gagaagcaaa aactactcta ttttgtgcat cagatgctaa agcatatgag    180

aaagaagtgc ataatgtctg ggctacacat gcctgtgtac ccacagaccc caacccacaa    240

gaagtgattt tgggcaatgt aacagaaaat tttaacatgt ggaaaaatga catggtggat    300

cagatgcagg aagatataat cagtttatgg gatcaaagcc ttaagccatg tgtaaaattg    360

accccactct gtgtcacttt aaactgtaca aatgcaactg ttaactacaa taatacctct    420

aaagacatga aaaattgctc tttctatgta accacagaat taagagataa gaaaaagaaa    480

gaaaatgcac ttttttatag acttgatata gtaccactta taataggaa gaatgggaat    540

attaacaact atagattaat aaattgtaat acctcagcca taacacaagc ctgtccaaaa    600

gtctcgtttg acccaattcc tatacattat tgtgctccag ctggttatgc gcctctaaaa    660

tgtaataata agaaattcaa tggaatagga ccatgcgata atgtcagcac agtacaatgt    720

acacatggaa ttaagccagt ggtatcaact caattactgt aaatggtag cctagcagaa    780

gaagagataa taattagatc tgaaaatctg acaaacaatg tcaaaacaat aatagtacat    840

cttaatgaat ctatagagat taaatgtaca agacctggca ataatacaag aaagagtgtg    900

agaataggac caggacaagc attctatgca acaggagaca ataggaga tataagacaa    960
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89

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gcacattgta  acattagtaa  aaatgaatgg  aatacaactt  tacaaagggt  aagtcaaaaa    1020

ttacaagaac  tcttccctaa  tagtacaggg  ataaaatttg  caccacactc  aggaggggac    1080

ctagaaatta  ctacacatag  ctttaattgt  ggaggagaat  ttttctattg  caatacaaca    1140

gacctgttta  atagtacata  cagtaatggt  acatgcacta  atggtacatg  catgtctaat    1200

aatacagagc  gcatcacact  ccaatgcaga  ataaaacaaa  ttataaacat  gtggcaggag    1260

gtaggacgag  caatgtatgc  ccctcccatt  gcaggaaaca  taacatgtag  atcaaatatt    1320

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gaaattaaac  cattaggagt  agcacccact  gctgcaaaaa  ggagagtggt  ggagagagaa    1500

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gtctggggca  ttaagcagct  ccaggcaaga  gtcctggcta  tagagagata  cctacaggat    1740

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tggaactcta  gttggagtaa  taaaactcaa  agtgatattt  gggataacat  gacctggatg    1860

cagtgggata  gggaaattag  taattacaca  aacacaatat  acaggttgct  tgaagactcg    1920

caaagccagc  aggaaagaaa  tgaaaaagat  ttactagcat  tggacaggtg  gaacaatctg    1980

tggaattggt  ttagcataac  aaattggctg  tggtatataa  aaatattcat  aatgatagta    2040

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cagggatact  cacccttgtc  attgcagacc  cttatcccaa  acccgagggg  acccgacagg    2160

ctcggaggaa  tcgaagaaga  aggtggagag  caagacagca  gcagatccat  tcgattagtg    2220

agcggattct  tgacacttgc  ctgggacgac  ctacgaagcc  tgtgcctctt  ctgctaccac    2280

cgattgagag  acttcatatt  aattgtagtg  agagcagtgg  aacttctggg  acacagtagt    2340

ctcaggggac  tgcagagggg  gtggggaacc  cttaagtatt  tggggagtct  tgtgcaatat    2400

tggggtctag  agttaaaaaa  gagtgctatt  aatctgcttg  atactatagc  aatagcagta    2460

gctgaaggaa  cagataggat  tctagaattc  atacaaaacc  tttgtagagg  tatccgcaac    2520

gtacctagaa  gaataagaca  gggcttcgaa  gcagctttgc  aataa              2565


<210>  99
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90

<211> 1491
<212> DNA
<213> Artificial

<220>
<223> Gag_TV2_C_ZAopt

<400> 99
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ctgcgccccg gcggccgcaa gcactacatg ctgaagcacc tggtgtgggc cagccgcgag   120

ctggagcgct tcgccgtgaa ccccggcctg ctggagacca gcgacggctg ccgccagatc   180

atcaagcagc tgcagcccgc cctgcagacc ggcaccgagg agatccgcag cctgttcaac   240

accgtggcca ccctgtactg cgtgcacaag ggcatcgacg tgcgcgacac caaggaggcc   300

ctggacaaga tcgaggagga gcagaacaag tgccagcaga gacccagca ggccgaggcc   360

gccgacaaga aggtgagcca gaactacccc atcgtgcaga acctgcaggg ccagatggtg   420

caccaggcca tcagcccccg caccctgaac gcctgggtga aggtgatcga ggagaaggcc   480

ttcagccccg aggtgatccc catgttcacc gccctgagcg agggcgccac cccccaggac   540

ctgaacacca tgctgaacac cgtgggcggc caccaggccg ccatgcagat gctgaaggac   600

accatcaacg aggaggccgc cgagtgggac cgcctgcacc ccgtgcacgc cggccccgtg   660

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gacatcaagc agggcccccaa ggagcccttc cgcgactacg tggaccgctt cttcaagacc   900

ctgcgcgccg agcagagcac ccaggaggtg aagaactgga tgaccgacac cctgctggtg   960

cagaacgcca accccgactg caagaccatc ctgcgcgccc tgggcccccgg cgccagcctg   1020

gaggagatga tgaccgcctg ccagggcgtg ggcggcccca gccacaaggc ccgcgtgctg   1080

gccgaggcca tgagccaggc caacaacacc agcgtgatga tccagaagag caacttcaag   1140

ggcccccgcc gcgccgtgaa gtgcttcaac tgcggccgcg agggccacat cgcccgcaac   1200

tgccgcgccc cccgcaagcg cggctgctgg aagtgcggca aggagggcca ccagatgaag   1260

gactgcaccg agcgccaggc caacttcctg ggcaagatct ggcccagcca aagggccgc   1320

cccggcaact tcctgcagag ccgcccccgag cccaccgccc cccccctgga gcccaccgcc   1380

ccccccgccg agagcttcaa gttcaaggag acccccaagc aggagcccaa ggaccgcgag   1440

cccctgacca gcctgaagag cctgttcggc agcgacccccc tgagccagta a   1491

91

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<210>  100
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<212>  DNA
<213>  Artificial

<220>
<223>  Gag_TV2_C_ZAwt

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ttacggccag ggggggagaaa acactatatg ctaaaacacc tagtatgggc aagcagagag     120

ctggaaagat ttgcagttaa ccctggcctt ttagagacat cagacggatg tagacaaata     180

ataaaacagc tacaaccagc tcttcagaca ggaacagagg aaattagatc attatttaac     240

acagtagcaa ctctctattg tgtacataaa gggatagatg tacgagacac caaggaagcc     300

ttagacaaga tagaggagga acaaaacaaa tgtcagcaaa aaacacagca ggcggaagcg     360

gctgacaaaa aggtcagtca aaattatcct atagtgcaga acctccaagg gcaaatggta     420

caccaggcca tatcacctag aaccttgaat gcatgggtaa aagtaataga ggagaaggct     480

tttagcccag aggtaatacc catgtttaca gcattatcag aaggagccac cccacaagat     540

ttaaacacca tgttaaatac agtggggggga catcaagcag ccatgcaaat gttaaaagat     600

accatcaatg aggaggctgc agaatgggat aggttacatc cagtacatgc agggcctgtt     660

gcaccaggcc agatgagaga accaagggga agtgacatag caggaactac tagtaccctt     720

caagaacaaa tagcatggat gacaagtaac ccacctatcc cagtagggga catctataaa     780

aggtggataa ttctggggtt aaataaaata gtaagaatgt acagccctgt cagcatttta     840

gacataaaac aaggaccaaa ggaacccttt agagactatg tagaccggtt cttcaaaact     900

ttaagagctg aacaatctac acaagaggta aaaaattgga tgacagacac cttgttagtc     960

caaaatgcga acccagattg taagaccatt ttaagagcat taggaccagg ggcttcatta    1020

gaagaaatga tgacagcatg tcagggagtg ggaggaccta gccacaaagc aagagttttg    1080

gctgaggcaa tgagccaagc aaacaataca agtgtaatga tacagaaaag caattttaaa    1140

ggccctagaa gagctgttaa atgtttcaac tgtggcaggg aagggcacat agccaggaat    1200

tgcagggccc ctaggaaaag gggctgttgg aaatgtggaa aggaaggaca ccaaatgaaa    1260

gactgtactg agaggcaggc taattttttа gggaaaattt ggccttccca caaggggagg    1320

ccagggaatt ccttcagag cagaccagag ccaacagccc caccactaga accaacagcc    1380
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92

ccaccagcag agagcttcaa gttcaaggag actccgaagc aggagccgaa agacagggaa   1440

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<213> Artificial

<220>
<223> Nef_TV2_C_ZAopt

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ggcgccctga ccaccagcaa caccgcccac aacaacgccg cctgcgcctg gctggaggcc   180

caggaggagg agggcgaggt gggcttcccc gtgcgccccc aggtgcccct gcgccccatg   240

acctacaagg ccgccatcga cctgagcttc ttcctgaagg agaagggcgg cctggagggc   300

ctgatctaca gcaagaagcg ccaggagatc ctggacctgt gggtgtacaa cacccagggc   360

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ggctggtact tcaagctgga gcccgtggac ccccgcgagg tggaggaggc caacgagggc   480

gagaacaact gcctgctgca ccccatgagc cagcacggca tggaggacga ggaccgcgag   540

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<212> DNA
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ggggcactta caaccagcaa cacagcccac aacaatgctg cttgcgcctg gctggaagcg   180

caagaggagg aaggagaagt aggctttcca gtcagacctc aggtaccttt aagaccaatg   240

acttataaag cagcaataga tctcagcttc tttttaaaag aaaagggggg actggaaggg   300

ttaatttact ccaagaaaag gcaagagatc cttgatttgt gggtttataa cacacaaggc   360

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ttcttccctg attggcaaaa ctacacaccg ggaccagggg tcagatttcc actgaccttt      420

ggatggtact tcaagctaga gccagtcgat ccaagggaag tagaagaggc caatgaagga      480

gaaaacaact gtttactaca ccctatgagc cagcatggaa tggaggatga agacagagaa      540

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ccggagtatt acaaagactg ctga                                            624


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<220>
<223>   Pol_TV2_C_ZAopt

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cagggcgaca gcgaggccgg cgccgagcgc cagggcacct tcaacttccc ccagatcacc      180

ctgtggcagc gccccctggt gagcatcaag gtggccggcc agaccaagga ggccctgctg      240

gacaccggcg ccgacgacac cgtgctggag gagatcaacc tgcccggcaa gtggaagccc      300

aagatgatcg gcggcatcgg cggcttcatc aaggtgcgcc agtacgacca gatcctgatc      360

gagatctgcg gcaagcgcgc catcggcacc gtgctggtgg cccccacccc cgtgaacatc      420

atcggccgca acctgctgac ccagctgggc tgcaccctga acttccccat cagccccatc      480

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aagatcacca gatcggccc cgagaacccc tacaacaccc ccgtgttcgc catcaagaag      660

aaggacagca ccaagtggcg caagctggtg gacttccgcg agctgaacaa gcgcacccag      720

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gtgaccgtgc tggacgtggg cgacgcctac ttcagcgtgc ccctggacga gagcttccgc      840

aagtacaccg ccttcaccat ccccagcatc aacaacgaga cccccggcat ccgctaccag      900

tacaacgtgc tgccccaggg ctggaagggc agccccgcca tcttccagag cagcatgacc      960

cgcatcctgg agcccttccg cacccagaac cccgaggtgg tgatctacca gtacatggac     1020

gacctgtacg tgggcagcga cctggagatc ggccagcacc gcgccaagat cgaggagctg     1080
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ttcaagaacc tgcgcaccgg caagtacgcc aagatgcgca ccgcccacac caacgacgtg   1560

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accccaagt tccgcctgcc catccccaag gagacctggg agacctggtg gagcgactac   1680

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gccaaccgcg agaccaagat cggcaaggcc ggctacgtga ccgacaaggg ccgccagaag   1860

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atccaggccc agcccgacaa gagcgagagc gagctggtga ccagatcat cgagcagctg   2040

atcaagaagg agaaggtgta cctgagctgg gtgcccgccc acaagggcat cggcggcaac   2100

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gtgaaggccg cctgctggtg ggccgacatc cagcgcgagt tcggcatccc ctacaacccc   2580

cagagccagg gcgtggtgga gagcatgaac aaggagctga gaagatcat cggccaggtg   2640

cgcgaccagg ccgagcacct gaagaccgcc gtgcagatgg ccgtgttcat ccacaacttc   2700

aagcgcaagg gcggcatcgg cggctacagc gccggcgagc gcatcatcga catcatcgcc   2760

agcgacatcc agaccaagga gctgcagaag cagatcatca agatccagaa cttccgcgtg   2820
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95

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tactaccgcg acagccgcga ccccatctgg aagggccccg ccaagctgct gtggaagggc    2880

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gacgaggac                                                           3009


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<213>  Artificial

<220>
<223>  Pol_TV2_C_ZAwt

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caaggagact ccgaagcagg agccgaaaga cagggaacct ttaacttccc tcaaatcact     180

ctttggcagc gacccccttgt ctcaataaaa gtagcgggcc aaacaaagga ggctctttta    240

gatacaggag cagatgatac agtactagaa gaaataaact tgccaggaaa atggaaacca     300

aaaatgatag gaggaattgg aggttttatc aaagtaagac agtatgatca aatacttata     360

gaaatttgtg gaaaaagggc tataggtaca gtattagtag gacctacacc tgtcaacata     420

attggaagaa atctgttgac tcagcttgga tgcacactaa attttccaat tagcccccatt     480

gaaactgtac cagtaaaatt aaagccagga atggatggcc caaaggttaa acaatggcca     540

ttgacagaag aaaaaataaa agcattaaca gaaatttgtg aggaaatgga gaaggaagga     600

aaaattacaa aaattgggcc tgaaaatcca tataacactc cagtatttgc cataaagaag     660

aaggacagta caaagtggag aaaattagta gatttcaggg aactcaataa aagaactcaa     720

gacttttggg aagtccaatt aggaatacca cacccagcag ggttaaaaaa gaaaaaatca     780

gtgacagtac tggatgtggg agatgcatat ttttcagtcc ctttagatga gagcttcaga     840

aaatatactg cattcaccat acctagtata aacaatgaaa caccagggat tagatatcaa     900

tataatgttc ttccacaggg atggaaagga tcaccagcaa tattccagag tagcatgaca     960

agaatcttag agccctttag aacacaaaac ccagaagtag ttatctatca atatatggat    1020

gacttatatg taggatctga cttagaaata gggcaacata gagcaaaaat agaggagtta    1080

agaggacacc tattgaaatg gggatttacc acaccagaca agaaacatca gaaagaaccc    1140
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96

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ccatttcttt ggatggggta tgaactccat cctgacaaat ggacagtaca gcctatacag   1200

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gccaaagcac taacagacat agtgccactg actgaagaag cagaattaga attggctgag   1380

aacagggaaa ttctaaaaga accagtacat ggagtatatt atgacccatc aaaagattta   1440

atagctgaaa tacagaaaca ggggaatgac caatggacat atcaaattta ccaagaacca   1500

tttaaaaatc tgagaacagg aaagtatgca aaaatgagga ctgcccacac taatgatgtg   1560

aaacagttag cagaggcagt gcaaaagata acccaggaaa gcatagtaat atggggaaaa   1620

actcctaaat ttagactacc catcccaaaa gaaacatggg agacatggtg gtcagactat   1680

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gccaataggg aaactaaaat aggaaaagca gggtatgtca ctgacaaagg aaggcagaaa   1860

gttgtttcct tcactgaaac aacaaatcag aagactgaat tacaagcaat tcagctagct   1920

ttgcaggatt cagggccaga agtaaacata gtaacagact cacagtatgc attaggaatc   1980

attcaagcac aaccagataa gagtgaatca gaattagtca gtcaaataat agaacagttg   2040

ataaaaaagg aaaaagtcta cctatcatgg gtaccagcac ataaaggaat tggaggaaat   2100

gaacaagtag acaaattagt aagtagtgga atcagaaaag tactgtttct agatggaata   2160

gataaagctc aagaagagca tgaaaaatat cacagcaatt ggagagcaat ggctagtgag   2220

tttaatctgc cacccatagt agcaaaggaa atagtagcca gctgtgataa atgtcagcta   2280

aaaggggaag ccatgcatgg acaagtcgac tgtagtccag gaatatggca attagactgt   2340

acacatttag aaggaaaaat catcctagta gcagtccatg tagccagtgg ctacatggaa   2400

gcagaggtta tcccagcaga aacaggacaa gaaacagcat actttatact aaaattagca   2460

ggaagatggc cagtcaaagt aatacataca gataatggca gtaatttcac cagtaccgca   2520

gttaaggcag cctgttggtg ggcagatatc aacgggaat ttggaattcc ctacaatccc   2580

caaagtcaag gagtagtaga atccatgaat aaagaattaa agaaaatcat agggcaagta   2640

agagatcaag ctgagcacct taagacagca gtacaaatgg cagtattcat tcacaatttt   2700

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tattacagag acagcagaga ccctatttgg aaaggaccag ccaaactact ctggaaaggt   2880
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97

gaaggggcag tagtaataca agataatagt gatataaagg tagtaccaag aaggaaagca   2940

aaaatcatta aggactatgg aaaacagatg gcaggtgctg attgtgtggc aggtagacag   3000

gatgaagat   3009

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<211> 75
<212> DNA
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<220>
<223> RevExon1_TV2_C_ZAopt

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atcctgtacc agagc   75

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<211> 76
<212> DNA
<213> Artificial

<220>
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<400> 106
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atcctctacc aaagca   76

<210> 107
<211> 246
<212> DNA
<213> Artificial

<220>
<223> RevExon2_TV2_C_ZAopt

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gcccgccagc agcagatcca cagcatcagc gagcgcatcc tggacacctg cctgggccgc   120

cccaccaagc ccgtgcccct gctgctgccc cccatcgagc gcctgcacat caactgcagc   180

gagagcagcg gcaccagcgg cacccagtag agccagggca ccgccgaggg cgtgggcaac   240

ccctaa   246

<210> 108

98

<211> 248
<212> DNA
<213> Artificial

<220>
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<400> 108
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gagcaagaca gcagcagatc cattcgatta gtgagcggat tcttgacact tgcctgggac   120

gacctacgaa gcctgtgcct cttctgctac caccgattga gagacttcat attaattgta   180

gtgagagcag tggaacttct gggacacagt agtctcaggg gactgcagag ggggtgggga   240

acccttaa   248

<210> 109
<211> 216
<212> DNA
<213> Artificial

<220>
<223> TatExon1_TV2_C_ZAopt

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gcctgcaacg ctgctactg caagcgctgc agctaccact gcctggtgtg cttccagaag   120

aagggcctgg gcatctacta cggccgcaag aagcgccgcc agcgccgcag cgccccccc   180

agcaacaagg accaccagga ccccctgccc aagcag   216

<210> 110
<211> 216
<212> DNA
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<220>
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gcttgtaatg ggtgttactg taaacgttgc agctatcatt gtctagtttg ctttcagaaa   120

aaaggcttag gcatttacta tggcaggaag aagcggagac agcgacgaag cgctcctcca   180

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<210> 111
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99

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agcaagaccg ccgccgaccc cttcgactag                                      90


<210>  112
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<212>  DNA
<213>  Artificial

<220>
<223>  TatExon2_TV2_C_ZAwt

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cccttatccc aaacccgagg ggacccgaca ggctcggagg aatcgaagaa gaaggtggag    60

agcaagacag cagcagatcc attcgattag                                      90


<210>  113
<211>  579
<212>  DNA
<213>  Artificial

<220>
<223>  Vif_TV2_C_ZAopt

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tggcacagcc tggtgaagca ccacatgtac gtgagccgcc gcgccgacgg ctggttctac   120

cgccaccact acgagagccg ccacccaag gtgagcagcg aggtgcacat ccccctgggc   180

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cgcggccgcc gcggcaacca caccatgaac ggccactag                           579


<210>  114
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100

<211> 579
<212> DNA
<213> Artificial

<220>
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agacatcatt atgaaagcag acacccaaaa gtaagttcag aagtacacat cccattagga   180

gatgccaggt tagtaataaa aacatattgg ggtctgcaga caggagaaag agcttggcat   240

ttgggtcacg gagtctccat agaatggaga ttgagaagat atagcacaca agtagaccct   300

gacctgacag accaactaat tcatatgcat tattttgatt gttttgcaga atctgccata   360

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aggggccgca gagggaacca tacaatgaat ggacactag   579

<210> 115
<211> 288
<212> DNA
<213> Artificial

<220>
<223> Vpr_TV2_C_ZAopt

<400> 115
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gagctgctgg aggagctgaa gcaggaggcc gtgcgccact tcccccgccc ctggctgcac   120

aacctgggcc agcacatcta cgagacctac ggcgacacct ggaccggcgt ggaggccatc   180

atccgcatcc tgcagcagct gctgttcatc cacttccgca tcggctgcca ccacagccgc   240

atcggcatcc tgcgccagcg ccgcgcccgc aacggcgcca accgcagc   288

<210> 116
<211> 288
<212> DNA
<213> Artificial

<220>
<223> Vpr_TV2_C_ZAwt

<400> 116
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gagcttttag aagaactcaa gcaggaagct gtcagacact ttcctagacc atggctccat   120

aacttaggac aacatatcta tgaaacctat ggagatactt ggacaggagt tgaagcaata   180

ataagaatcc tgcaacaatt actgtttatt catttcagga ttgggtgcca tcatagcaga   240

ataggcattt tgcgacagag aagagcaaga aatggagcca atagatcc   288

<210> 117
<211> 261
<212> DNA
<213> Artificial

<220>
<223> Vpu_TV2_C_ZAopt

<400> 117
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ctgatcatcg ccatcatcgt gtggaccatc gtgtacatcg agtaccgcaa gctggtgcgc   120

cagcgcaaga tcgactggct ggtgaagcgc atccgcgagc gcgccgagga cagcggcaac   180

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ctggacgcca acgacgtgta a   261

<210> 118
<211> 261
<212> DNA
<213> Artificial

<220>
<223> Vpu_TV2_C_ZAwt

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ctaatcatag caataatagt gtggaccata gtatatatag aatataggaa attggtaagg   120

caaaggaaaa tagactggtt agttaaaagg attagggaaa gagcagaaga cagtggcaat   180

gagagcgagg gggatactga agaattatcg acactggtgg atatggggca tcttaggctt   240

ttggatgcta atgatgtgta a   261

<210> 119
<211> 1473
<212> DNA
<213> Artificial

<220>
<223> gp120mod.TV1.delV2

<400> 119
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ggcgtgcccg tgtggcgcga cgccaagacc accctgttct cgccagcga cgccaaggcc     180

tacgagaccg aggtgcacaa cgtgtgggcc acccacgcct gcgtgcccac cgaccccaac     240

ccccaggaga tcgtgctggg caacgtgacc gagaacttca acatgtggaa gaacgacatg     300

gccgaccaga tgcacgagga cgtgatcagc ctgtgggacc agagcctgaa gccctgcgtg     360

aagctgaccc ccctgtgcgt gaccctgaac tgcaccgaca ccaacgtgac cggcaaccgc     420

accgtgaccg gcaacagcac caacaacacc aacggcaccg gcatctacaa catcgaggag     480

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103

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104

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105

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106

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107

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110

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112

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113

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114

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116

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117

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<213>   Artificial

<220>
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        cleavage site

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119

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ggcgtgcccg tgtggcgcga cgccaagacc accctgttct cgccagcga cgccaaggcc   180

tacgagaccg aggtgcacaa cgtgtgggcc acccacgcct gcgtgcccac cgaccccaac   240

ccccaggaga tcgtgctggg caacgtgacc gagaacttca catgtggaa gaacgacatg   300

gccgaccaga tgcacgagga cgtgatcagc ctgtgggacc agagcctgaa gccctgcgtg   360

aagctgaccc ccctgtgcgt gaccctgaac tgcaccgaca ccaacgtgac cggcaaccgc   420

accgtgaccg caacagcac caacaacacc aacggcaccg gcatctacaa catcgaggag   480

atgaagaact gcagcttcaa cgccaccacc gagctgcgcg acaagaagca caaggagtac   540

gccctgttct accgcctgga catcgtgccc ctgaacgaga cagcgacaa cttcacctac   600

cgcctgatca actgcaacac cagcaccatc acccaggcct gccccaaggt gagcttcgac   660

```
cccatccca   tccactactg   cgccccgcc   ggctacgcca   tcctgaagtg   caacaacaag      720

accttcaacg   gcaccggccc   ctgctacaac   gtgagcaccg   tgcagtgcac   ccacggcatc      780

aagcccgtgg   tgagcaccca   gctgctgctg   aacggcagcc   tggccgagga   gggcatcatc      840

atccgcagcg   agaacctgac   cgagaacacc   aagaccatca   tcgtgcacct   gaacgagagc      900

gtggagatca   actgcacccg   ccccaacaac   aacacccgca   agagcgtgcg   catcggcccc      960

ggccaggcct   tctacgccac   caacgacgtg   atcggcaaca   tccgccaggc   ccactgcaac     1020

atcagcaccg   accgctggaa   caagaccctg   cagcaggtga   tgaagaagct   gggcgagcac     1080

ttccccaaca   agaccatcca   gttcaagccc   cacgccggcg   cgacctgga   gatcaccatg     1140

cacagcttca   actgccgcgg   cgagttcttc   tactgcaaca   ccagcaacct   gttcaacagc     1200

acctaccaca   gcaacaacgg   cacctacaag   tacaacggca   acagcagcag   ccccatcacc     1260

ctgcagtgca   agatcaagca   gatcgtgcgc   atgtggcagg   gcgtgggcca   ggccacctac     1320

gcccccccca   tcgccggcaa   catcacctgc   cgcagcaaca   tcaccggcat   cctgctgacc     1380

cgcgacggcg   gcttcaacac   caccaacaac   accgagacct   tccgcccccgg   cggcggcgac     1440

atgcgcgaca   actggcgcag   cgagctgtac   aagtacaagg   tggtggagat   caagcccctg     1500

ggcatcgccc   ccaccaaggc   caagcgccgc   gtggtgcagc   gcgagaagcg   cgccgtgggc     1560

atcggcgccg   tgttcctggg   cttcctgggc   gccgccggca   gcaccatggg   cgccgccagc     1620

atcaccctga   ccgtgcaggc   ccgccagctg   ctgagcggca   tcgtgcagca   gcagagcaac     1680

ctgctgaagg   ccatcgaggc   ccagcagcac   atgctgcagc   tgaccgtgtg   gggcatcaag     1740

cagctgcagg   cccgcgtgct   ggccatcgag   cgctacctga   aggaccagca   gctgctgggc     1800

atctggggct   gcagcggccg   cctgatctgc   accaccgccg   tgccctggaa   cagcagctgg     1860

agcaacaaga   gcgagaagga   catctgggac   aacatgacct   ggatgcagtg   ggaccgcgag     1920

atcagcaact   acaccggcct   gatctacaac   ctgctggagg   acagccagaa   ccagcaggag     1980

aagaacgaga   aggacctgct   ggagctggac   aagtggaaca   acctgtggaa   ctggttcgac     2040

atcagcaact   ggccctggta   catctaactc   gag                                     2073
```

121

<400> 133

```
gaattcatga gagtgatggg gacacagaag aattgtcaac aatggtggat atggggcatc      60

ttaggcttct ggatgctaat gatttgtaac accgaggacc tgtgggtgac cgtgtactac     120

ggcgtgcccg tgtggcgcga cgccaagacc accctgttct gcgccagcga cgccaaggcc     180

tacgagaccg aggtgcacaa cgtgtgggcc acccacgcct gcgtgcccac cgaccccaac     240

ccccaggaga tcgtgctggg caacgtgacc gagaacttca acatgtggaa gaacgacatg     300

gccgaccaga tgcacgagga cgtgatcagc ctgtgggacc agagcctgaa gccctgcgtg     360

aagctgaccc ccctgtgcgt gaccctgaac tgcaccgaca ccaacgtgac cggcaaccgc     420

accgtgaccg gcaacagcac caacaacacc aacggcaccg gcatctacaa catcgaggag     480

atgaagaact gcagcttcaa cgccaccacc gagctgcgcg acaagaagca caaggagtac     540

gccctgttct accgcctgga catcgtgccc ctgaacgaga acagcgacaa cttcacctac     600

cgcctgatca actgcaacac cagcaccatc acccaggcct gccccaaggt gagcttcgac     660

cccatcccca tccactactg cgcccccgcc ggctacgcca tcctgaagtg caacaacaag     720

accttcaacg gcaccggccc ctgctacaac gtgagcaccg tgcagtgcac ccacggcatc     780

aagcccgtgg tgagcaccca gctgctgctg aacggcagcc tggccgagga gggcatcatc     840

atccgcagcg agaacctgac cgagaacacc aagaccatca tcgtgcacct gaacgagagc     900

gtggagatca ctgcacccg ccccaacaac aacacccgca gagcgtgcg catcggcccc     960

ggccaggcct tctacgccac caacgacgtg atcggcaaca tccgccaggc ccactgcaac    1020

atcagcaccg accgctggaa caagaccctg cagcaggtga tgaagaagct gggcgagcac    1080

ttccccaaca agaccatcca gttcaagccc cacgccggcg gcgacctgga gatcaccatg    1140

cacagcttca ctgccgcgg cgagttcttc tactgcaaca ccagcaacct gttcaacagc    1200

acctaccaca gcaacaacgg cacctacaag tacaacggca cagcagcag ccccatcacc    1260

ctgcagtgca agatcaagca gatcgtgcgc atgtggcagg gcgtgggcca ggccacctac    1320

gcccccccca tcgccggcaa catcacctgc cgcagcaaca tcaccggcat cctgctgacc    1380

cgcgacggcg gcttcaacac caccaacaac accgagacct tccgcccccgg cggcggcgac    1440

atgcgcgaca actggcgcag cgagctgtac aagtacaagg tggtggagat caagcccctg    1500

ggcatcgccc ccaccaaggc caagcgccgc gtggtgcagc gcgagaagcg cgccgtgggc    1560

atcggcgccg tgttcctggg cttcctgggc gccgccggca gcaccatggg cgccgccagc    1620

atcaccctga ccgtgcaggc ccgccagctg ctgagcggca tcgtgcagca gcagagcaac    1680
```

122

```
ctgctgaagg ccatcgaggc ccagcagcac atgctgcagc tgaccgtgtg gggcatcaag      1740

cagctgcagg cccgcgtgct ggccatcgag cgctacctga aggaccagca gctgctgggc      1800

atctggggct gcagcggccg cctgatctgc accaccgccg tgccctggaa cagcagctgg      1860

agcaacaaga gcgagaagga catctgggac aacatgacct ggatgcagtg ggaccgcgag      1920

atcagcaact acaccggcct gatctacaac ctgctggagg acagccagaa ccagcaggag      1980

aagaacgaga aggacctgct ggagctggac aagtggaaca acctgtggaa ctggttcgac      2040

atcagcaact ggccctggta catctaactc gag                                   2073


<210>   134
<211>   624
<212>   DNA
<213>   Artificial

<220>
<223>   NefD125G_TV2_C_ZAopt

<400>   134
atgggcggca agtggagcaa gagcagcatc atcggctggc ccgaggtgcg cgagcgcatc        60

cgccgcaccc gcagcgccgc cgagggcgtg ggcagcgcca gccaggacct ggagaagcac       120

ggcgccctga ccaccagcaa caccgcccac aacaacgccg cctgcgcctg gctggaggcc       180

caggaggagg agggcgaggt gggcttcccc gtgcgccccc aggtgcccct gcgccccatg       240

acctacaagg ccgccatcga cctgagcttc ttcctgaagg agaagggcgg cctggagggc       300

ctgatctaca gcaagaagcg ccaggagatc ctggacctgt gggtgtacaa cacccagggc       360

ttcttccccg gctggcagaa ctacaccccc ggccccggcg tgcgcttccc cctgaccttc       420

ggctggtact tcaagctgga gcccgtggac ccccgcgagg tggaggaggc caacgagggc       480

gagaacaact gcctgctgca ccccatgagc cagcacggca tggaggacga ggaccgcgag       540

gtgctgcgct ggaagttcga cagcaccctg gcccgccgcc acatggcccg cgagctgcac       600

cccgagtact acaaggactg ctga                                             624


<210>   135
<211>   624
<212>   DNA
<213>   Artificial

<220>
<223>   NefD125G-Myr_TV2_C_ZAopt

<400>   135
atggccggca agtggagcaa gagcagcatc atcggctggc ccgaggtgcg cgagcgcatc        60
```

123

```
cgccgcaccc gcagcgccgc cgagggcgtg ggcagcgcca gccaggacct ggagaagcac      120

ggcgccctga ccaccagcaa caccgcccac aacaacgccg cctgcgcctg gctggaggcc      180

caggaggagg agggcgaggt gggcttcccc gtgcgccccc aggtgcccct gcgccccatg      240

acctacaagg ccgccatcga cctgagcttc ttcctgaagg agaagggcgg cctggagggc      300

ctgatctaca gcaagaagcg ccaggagatc ctggacctgt gggtgtacaa cacccagggc      360

ttcttccccg gctggcagaa ctacacccc ggccccggcg tgcgcttccc cctgaccttc      420

ggctggtact tcaagctgga gcccgtggac ccccgcgagg tggaggaggc caacgagggc      480

gagaacaact gcctgctgca ccccatgagc cagcacggca tggaggacga ggaccgcgag      540

gtgctgcgct ggaagttcga cagcaccctg gcccgccgcc acatggcccg cgagctgcac      600

cccgagtact acaaggactg ctga                                             624
```

<210> 136
<211> 27
<212> PRT
<213> Artificial

<220>
<223> TV1c8.2 signal peptide leader sequence

<400> 136

```
Met Arg Val Met Gly Thr Gln Lys Asn Cys Gln Gln Trp Trp Ile Trp
1               5                   10                  15


Gly Ile Leu Gly Phe Trp Met Leu Met Ile Cys
            20                  25
```

<210> 137
<211> 81
<212> DNA
<213> Artificial

<220>
<223> WTnative (8-2_TV1_C.ZA) signal peptide leader sequence

<400> 137
```
atgagagtga tggggacaca gaagaattgt caacaatggt ggatatgggg catcttaggc      60

ttctggatgc taatgatttg t                                                81
```

<210> 138
<211> 81
<212> DNA

124
```

<213> Artificial

<220>
<223> WTmod (8-2_TV1_C.ZA) signal peptide leader sequence

<400> 138
atgcgcgtga tgggcacccca gaagaactgc agcagtggt ggatctgggg catcctgggc   60

ttctggatgc tgatgatctg c   81

<210> 139
<211> 25
<212> PRT
<213> Artificial

<220>
<223> Tpa1 signal peptide leader sequence

<400> 139

Met Asp Ala Met Lys Arg Gly Leu Cys Cys Val Leu Leu Leu Cys Gly
1   5   10   15

Ala Val Phe Val Ser Pro Ser Ala Ser
            20   25

<210> 140
<211> 75
<212> DNA
<213> Artificial

<220>
<223> Tpa1 signal peptide leader sequence

<400> 140
atggatgcaa tgaagagagg gctctgctgt gtgctgctgc tgtgtggagc agtcttcgtt   60

tcgcccagcg ccagc   75

<210> 141
<211> 23
<212> PRT
<213> Artificial

<220>
<223> Tpa2 signal peptide leader sequence

<400> 141

Met Asp Ala Met Lys Arg Gly Leu Cys Cys Val Leu Leu Leu Cys Gly
1   5   10   15

```
Ala Val Phe Val Ser Pro Ser
            20


<210>   142
<211>   69
<212>   DNA
<213>   Artificial

<220>
<223>   Tpa2 signal peptide leader sequence

<400>   142
atggatgcaa tgaagagagg gctctgctgt gtgctgctgc tgtgtggagc agtcttcgtt      60

tcgcccagc                                                             69


<210>   143
<211>   842
<212>   PRT
<213>   Human immunodeficiency virus SF162

<400>   143

Met Asp Ala Met Lys Arg Gly Leu Cys Cys Val Leu Leu Leu Cys Gly
1               5                   10                  15


Ala Val Phe Val Ser Pro Ser Ala Val Glu Lys Leu Trp Val Thr Val
            20                  25                  30


Tyr Tyr Gly Val Pro Val Trp Lys Glu Ala Thr Thr Thr Leu Phe Cys
        35                  40                  45


Ala Ser Asp Ala Lys Ala Tyr Asp Thr Glu Val His Asn Val Trp Ala
    50                  55                  60


Thr His Ala Cys Val Pro Thr Asp Pro Asn Pro Gln Glu Ile Val Leu
65                  70                  75                  80


Glu Asn Val Thr Glu Asn Phe Asn Met Trp Lys Asn Asn Met Val Glu
                85                  90                  95


Gln Met His Glu Asp Ile Ile Ser Leu Trp Asp Gln Ser Leu Lys Pro
            100                 105                 110


Cys Val Lys Leu Thr Pro Leu Cys Val Thr Leu His Cys Thr Asn Leu
            115                 120                 125
```

126

Lys Asn Ala Thr Asn Thr Lys Ser Ser Asn Trp Lys Glu Met Asp Arg
    130   135   140

Gly Glu Ile Lys Asn Cys Ser Phe Lys Val Thr Thr Ser Ile Arg Asn
145   150   155   160

Lys Met Gln Lys Glu Tyr Ala Leu Phe Tyr Lys Leu Asp Val Val Pro
                165   170   175

Ile Asp Asn Asp Asn Thr Ser Tyr Lys Leu Ile Asn Cys Asn Thr Ser
                180   185   190

Val Ile Thr Gln Ala Cys Pro Lys Val Ser Phe Glu Pro Ile Pro Ile
        195   200   205

His Tyr Cys Ala Pro Ala Gly Phe Ala Ile Leu Lys Cys Asn Asp Lys
    210   215   220

Lys Phe Asn Gly Ser Gly Pro Cys Thr Asn Val Ser Thr Val Gln Cys
225   230   235   240

Thr His Gly Ile Arg Pro Val Val Ser Thr Gln Leu Leu Leu Asn Gly
            245   250   255

Ser Leu Ala Glu Glu Gly Val Val Ile Arg Ser Glu Asn Phe Thr Asp
        260   265   270

Asn Ala Lys Thr Ile Ile Val Gln Leu Lys Glu Ser Val Glu Ile Asn
        275   280   285

Cys Thr Arg Pro Asn Asn Asn Thr Arg Lys Ser Ile Thr Ile Gly Pro
    290   295   300

Gly Arg Ala Phe Tyr Ala Thr Gly Asp Ile Ile Gly Asp Ile Arg Gln
305   310   315   320

Ala His Cys Asn Ile Ser Gly Glu Lys Trp Asn Asn Thr Leu Lys Gln
                325   330   335

Ile Val Thr Lys Leu Gln Ala Gln Phe Gly Asn Lys Thr Ile Val Phe
            340   345   350

Lys Gln Ser Ser Gly Gly Asp Pro Glu Ile Val Met His Ser Phe Asn

Cys Gly Gly Glu Phe Phe Tyr Cys Asn Ser Thr Gln Leu Phe Asn Ser
    370   375   380

Thr Trp Asn Asn Thr Ile Gly Pro Asn Asn Thr Asn Gly Thr Ile Thr
385   390   395   400

Leu Pro Cys Arg Ile Lys Gln Ile Ile Asn Arg Trp Gln Glu Val Gly
            405   410   415

Lys Ala Met Tyr Ala Pro Pro Ile Arg Gly Gln Ile Arg Cys Ser Ser
            420   425   430

Asn Ile Thr Gly Leu Leu Leu Thr Arg Asp Gly Gly Lys Glu Ile Ser
        435   440   445

Asn Thr Thr Glu Ile Phe Arg Pro Gly Gly Gly Asp Met Arg Asp Asn
    450   455   460

Trp Arg Ser Glu Leu Tyr Lys Tyr Lys Val Val Lys Ile Glu Pro Leu
465   470   475   480

Gly Val Ala Pro Thr Lys Ala Lys Arg Arg Val Val Gln Arg Glu Lys
            485   490   495

Arg Ala Val Thr Leu Gly Ala Met Phe Leu Gly Phe Leu Gly Ala Ala
            500   505   510

Gly Ser Thr Met Gly Ala Arg Ser Leu Thr Leu Thr Val Gln Ala Arg
        515   520   525

Gln Leu Leu Ser Gly Ile Val Gln Gln Asn Asn Leu Leu Arg Ala
    530   535   540

Ile Glu Ala Gln Gln His Leu Leu Gln Leu Thr Val Trp Gly Ile Lys
545   550   555   560

Gln Leu Gln Ala Arg Val Leu Ala Val Glu Arg Tyr Leu Lys Asp Gln
            565   570   575

Gln Leu Leu Gly Ile Trp Gly Cys Ser Gly Lys Leu Ile Cys Thr Thr
            580   585   590

128

```
Ala Val Pro Trp Asn Ala Ser Trp Ser Asn Lys Ser Leu Asp Gln Ile
        595                 600                 605


Trp Asn Asn Met Thr Trp Met Glu Trp Glu Arg Glu Ile Asp Asn Tyr
    610                 615                 620


Thr Asn Leu Ile Tyr Thr Leu Ile Glu Glu Ser Gln Asn Gln Gln Glu
625                 630                 635                 640


Lys Asn Glu Gln Glu Leu Leu Glu Leu Asp Lys Trp Ala Ser Leu Trp
                645                 650                 655


Asn Trp Phe Asp Ile Ser Lys Trp Leu Trp Tyr Ile Lys Ile Phe Ile
            660                 665                 670


Met Ile Val Gly Gly Leu Val Gly Leu Arg Ile Val Phe Thr Val Leu
        675                 680                 685


Ser Ile Val Asn Arg Val Arg Gln Gly Tyr Ser Pro Leu Ser Phe Gln
    690                 695                 700


Thr Arg Phe Pro Ala Pro Arg Gly Pro Asp Arg Pro Glu Gly Ile Glu
705                 710                 715                 720


Glu Glu Gly Gly Glu Arg Asp Arg Asp Arg Ser Ser Pro Leu Val His
                725                 730                 735


Gly Leu Leu Ala Leu Ile Trp Asp Asp Leu Arg Ser Leu Cys Leu Phe
            740                 745                 750


Ser Tyr His Arg Leu Arg Asp Leu Ile Leu Ile Ala Ala Arg Ile Val
        755                 760                 765


Glu Leu Leu Gly Arg Arg Gly Trp Glu Ala Leu Lys Tyr Trp Gly Asn
    770                 775                 780


Leu Leu Gln Tyr Trp Ile Gln Glu Leu Lys Asn Ser Ala Val Ser Leu
785                 790                 795                 800


Phe Asp Ala Ile Ala Ile Ala Val Ala Glu Gly Thr Asp Arg Ile Ile
            805                 810                 815
```

Glu Val Ala Gln Arg Ile Gly Arg Ala Phe Leu His Ile Pro Arg Arg
            820   825   830

Ile Arg Gln Gly Phe Glu Arg Ala Leu Leu
        835   840

<210> 144
<211> 867
<212> PRT
<213> Human immunodeficiency virus TV1.8_2

<400> 144

Met Arg Val Met Gly Thr Gln Lys Asn Cys Gln Gln Trp Trp Ile Trp
1   5   10   15

Gly Ile Leu Gly Phe Trp Met Leu Met Ile Cys Asn Thr Glu Asp Leu
            20   25   30

Trp Val Thr Val Tyr Tyr Gly Val Pro Val Trp Arg Asp Ala Lys Thr
        35   40   45

Thr Leu Phe Cys Ala Ser Asp Ala Lys Ala Tyr Glu Thr Glu Val His
    50   55   60

Asn Val Trp Ala Thr His Ala Cys Val Pro Thr Asp Pro Asn Pro Gln
65   70   75   80

Glu Ile Val Leu Gly Asn Val Thr Glu Asn Phe Asn Met Trp Lys Asn
                85   90   95

Asp Met Ala Asp Gln Met His Glu Asp Val Ile Ser Leu Trp Asp Gln
            100   105   110

Ser Leu Lys Pro Cys Val Lys Leu Thr Pro Leu Cys Val Thr Leu Asn
        115   120   125

Cys Thr Asp Thr Asn Val Thr Gly Asn Arg Thr Val Thr Gly Asn Ser
    130   135   140

Thr Asn Asn Thr Asn Gly Thr Gly Ile Tyr Asn Ile Glu Glu Met Lys
145   150   155   160

Asn Cys Ser Phe Asn Ala Thr Thr Glu Leu Arg Asp Lys Lys His Lys

130

Glu Tyr Ala Leu Phe Tyr Arg Leu Asp Ile Val Pro Leu Asn Glu Asn
        180   185   190

Ser Asp Asn Phe Thr Tyr Arg Leu Ile Asn Cys Asn Thr Ser Thr Ile
        195   200   205

Thr Gln Ala Cys Pro Lys Val Ser Phe Asp Pro Ile Pro Ile His Tyr
    210   215   220

Cys Ala Pro Ala Gly Tyr Ala Ile Leu Lys Cys Asn Asn Lys Thr Phe
225   230   235   240

Asn Gly Thr Gly Pro Cys Tyr Asn Val Ser Thr Val Gln Cys Thr His
            245   250   255

Gly Ile Lys Pro Val Val Ser Thr Gln Leu Leu Leu Asn Gly Ser Leu
        260   265   270

Ala Glu Glu Gly Ile Ile Ile Arg Ser Glu Asn Leu Thr Glu Asn Thr
        275   280   285

Lys Thr Ile Ile Val His Leu Asn Glu Ser Val Glu Ile Asn Cys Thr
    290   295   300

Arg Pro Asn Asn Asn Thr Arg Lys Ser Val Arg Ile Gly Pro Gly Gln
305   310   315   320

Ala Phe Tyr Ala Thr Asn Asp Val Ile Gly Asn Ile Arg Gln Ala His
            325   330   335

Cys Asn Ile Ser Thr Asp Arg Trp Asn Lys Thr Leu Gln Gln Val Met
            340   345   350

Lys Lys Leu Gly Glu His Phe Pro Asn Lys Thr Ile Gln Phe Lys Pro
        355   360   365

His Ala Gly Gly Asp Leu Glu Ile Thr Met His Ser Phe Asn Cys Arg
    370   375   380

Gly Glu Phe Phe Tyr Cys Asn Thr Ser Asn Leu Phe Asn Ser Thr Tyr
385   390   395   400

131

His Ser Asn Asn Gly Thr Tyr Lys Tyr Asn Gly Asn Ser Ser Ser Pro
                405   410   415

Ile Thr Leu Gln Cys Lys Ile Lys Gln Ile Val Arg Met Trp Gln Gly
                420   425   430

Val Gly Gln Ala Thr Tyr Ala Pro Pro Ile Ala Gly Asn Ile Thr Cys
                435   440   445

Arg Ser Asn Ile Thr Gly Ile Leu Leu Thr Arg Asp Gly Gly Phe Asn
    450   455   460

Thr Thr Asn Asn Thr Glu Thr Phe Arg Pro Gly Gly Gly Asp Met Arg
465   470   475   480

Asp Asn Trp Arg Ser Glu Leu Tyr Lys Tyr Lys Val Val Glu Ile Lys
                485   490   495

Pro Leu Gly Ile Ala Pro Thr Lys Ala Lys Arg Arg Val Val Gln Arg
                500   505   510

Glu Lys Arg Ala Val Gly Ile Gly Ala Val Phe Leu Gly Phe Leu Gly
                515   520   525

Ala Ala Gly Ser Thr Met Gly Ala Ala Ser Ile Thr Leu Thr Val Gln
    530   535   540

Ala Arg Gln Leu Leu Ser Gly Ile Val Gln Gln Gln Ser Asn Leu Leu
545   550   555   560

Lys Ala Ile Glu Ala Gln Gln His Met Leu Gln Leu Thr Val Trp Gly
                565   570   575

Ile Lys Gln Leu Gln Ala Arg Val Leu Ala Ile Glu Arg Tyr Leu Lys
                580   585   590

Asp Gln Gln Leu Leu Gly Ile Trp Gly Cys Ser Gly Arg Leu Ile Cys
                595   600   605

Thr Thr Ala Val Pro Trp Asn Ser Ser Trp Ser Asn Lys Ser Glu Lys
610   615   620

132

Asp Ile Trp Asp Asn Met Thr Trp Met Gln Trp Asp Arg Glu Ile Ser
625   630   635   640

Asn Tyr Thr Gly Leu Ile Tyr Asn Leu Leu Glu Asp Ser Gln Asn Gln
                    645   650   655

Gln Glu Lys Asn Glu Lys Asp Leu Leu Glu Leu Asp Lys Trp Asn Asn
                660   665   670

Leu Trp Asn Trp Phe Asp Ile Ser Asn Trp Pro Trp Tyr Ile Lys Ile
            675   680   685

Phe Ile Met Ile Val Gly Gly Leu Ile Gly Leu Arg Ile Ile Phe Ala
            690   695   700

Val Leu Ser Ile Val Asn Arg Val Arg Gln Gly Tyr Ser Pro Leu Ser
705   710   715   720

Phe Gln Thr Leu Thr Pro Ser Pro Arg Gly Leu Asp Arg Leu Gly Gly
                725   730   735

Ile Glu Glu Glu Gly Gly Glu Gln Asp Arg Asp Arg Ser Ile Arg Leu
            740   745   750

Val Ser Gly Phe Leu Ser Leu Ala Trp Asp Asp Leu Arg Asn Leu Cys
            755   760   765

Leu Phe Ser Tyr His Arg Leu Arg Asp Phe Ile Leu Ile Ala Val Arg
            770   775   780

Ala Val Glu Leu Leu Gly His Ser Ser Leu Arg Gly Leu Gln Arg Gly
785   790   795   800

Trp Glu Ile Leu Lys Tyr Leu Gly Ser Leu Val Gln Tyr Trp Gly Leu
                805   810   815

Glu Leu Lys Lys Ser Ala Ile Ser Leu Leu Asp Thr Ile Ala Ile Thr
                820   825   830

Val Ala Glu Gly Thr Asp Arg Ile Ile Glu Leu Val Gln Arg Ile Cys
            835   840   845

133

Arg Ala Ile Leu Asn Ile Pro Arg Arg Ile Arg Gln Gly Phe Glu Ala
    850   855   860

Ala Leu Leu
865

<210> 145
<211> 869
<212> PRT
<213> Human immunodeficiency virus TV1.8_5

<400> 145

Met Arg Val Met Gly Thr Gln Lys Asn Cys Gln Gln Trp Trp Ile Trp
1   5   10   15

Gly Ile Leu Gly Phe Trp Met Leu Met Ile Cys Asn Thr Glu Asp Leu
            20   25   30

Trp Val Thr Val Tyr Tyr Gly Val Pro Val Trp Arg Glu Ala Lys Thr
        35   40   45

Thr Leu Phe Cys Ala Ser Asp Ala Lys Ala Tyr Glu Thr Glu Val His
    50   55   60

Asn Val Trp Ala Thr His Ala Cys Val Pro Thr Asp Pro Asn Pro Gln
65   70   75   80

Glu Ile Val Leu Gly Asn Val Thr Glu Asn Phe Asn Met Trp Lys Asn
            85   90   95

Asn Met Ala Asp Gln Met His Glu Asp Ile Ile Ser Leu Trp Asp Gln
            100   105   110

Ser Leu Lys Pro Cys Val Lys Leu Thr Pro Leu Cys Val Thr Leu Asn
        115   120   125

Cys Thr Asp Thr Asn Val Thr Gly Asn Arg Thr Val Thr Gly Asn Thr
    130   135   140

Asn Asp Thr Asn Ile Ala Asn Ala Thr Tyr Lys Tyr Glu Glu Met Lys
145   150   155   160

Asn Cys Ser Phe Asn Ala Thr Thr Glu Leu Arg Asp Lys Lys His Lys
            165   170   175

134

```
Glu Tyr Ala Leu Phe Tyr Lys Leu Asp Ile Val Pro Leu Asn Glu Asn
        180              185              190

Ser Asn Asn Phe Thr Tyr Arg Leu Ile Asn Cys Asn Thr Ser Thr Ile
        195              200              205

Thr Gln Ala Cys Pro Lys Val Ser Phe Asp Pro Ile Pro Ile His Tyr
    210              215              220

Cys Ala Pro Ala Asp Tyr Ala Ile Leu Lys Cys Asn Asn Lys Thr Phe
225              230              235              240

Asn Gly Thr Gly Pro Cys Tyr Asn Val Ser Thr Val Gln Cys Thr His
            245              250              255

Gly Ile Lys Pro Val Val Ser Thr Gln Leu Leu Leu Asn Gly Ser Leu
        260              265              270

Ala Glu Glu Gly Ile Ile Ile Arg Ser Glu Asn Leu Thr Glu Asn Thr
        275              280              285

Lys Thr Ile Ile Val His Leu Asn Glu Ser Val Glu Ile Asn Cys Thr
    290              295              300

Arg Pro Asn Asn Asn Thr Arg Lys Ser Val Arg Ile Gly Pro Gly Gln
305              310              315              320

Ala Phe Tyr Ala Thr Asn Asp Val Ile Gly Asn Ile Arg Gln Ala His
            325              330              335

Cys Asn Ile Ser Thr Asp Arg Trp Asn Lys Thr Leu Gln Gln Val Met
            340              345              350

Lys Lys Leu Gly Glu His Phe Pro Asn Lys Thr Ile Lys Phe Glu Pro
        355              360              365

His Ala Gly Gly Asp Leu Glu Ile Thr Met His Ser Phe Asn Cys Arg
    370              375              380

Gly Glu Phe Phe Tyr Cys Asn Thr Ser Asn Leu Phe Asn Ser Thr Tyr
385              390              395              400
```

135

```
Tyr Pro Lys Asn Gly Thr Tyr Lys Tyr Asn Gly Asn Ser Ser Leu Pro
            405                     410                 415


Ile Thr Leu Gln Cys Lys Ile Lys Gln Ile Val Arg Met Trp Gln Gly
            420                 425                 430


Val Gly Gln Ala Met Tyr Ala Pro Pro Ile Ala Gly Asn Ile Thr Cys
            435                 440                 445


Arg Ser Asn Ile Thr Gly Ile Leu Leu Thr Arg Asp Gly Gly Phe Asn
    450                 455                 460


Asn Thr Asn Asn Asp Thr Glu Glu Thr Phe Arg Pro Gly Gly Gly Asp
465                 470                 475                 480


Met Arg Asp Asn Trp Arg Ser Glu Leu Tyr Lys Tyr Lys Val Val Glu
                485                 490                 495


Ile Lys Pro Leu Gly Ile Ala Pro Thr Lys Ala Lys Arg Arg Val Val
            500                 505                 510


Gln Arg Lys Lys Arg Ala Val Gly Ile Gly Ala Val Phe Leu Gly Phe
            515                 520                 525


Leu Gly Ala Ala Gly Ser Thr Met Gly Ala Ala Ser Ile Thr Leu Thr
    530                 535                 540


Val Gln Ala Arg Gln Leu Leu Ser Gly Ile Val Gln Gln Gln Ser Asn
545                 550                 555                 560


Leu Leu Lys Ala Ile Glu Ala Gln Gln His Met Leu Gln Leu Thr Val
            565                 570                 575


Trp Gly Ile Lys Gln Leu Gln Ala Arg Val Leu Ala Ile Glu Arg Tyr
            580                 585                 590


Leu Lys Asp Gln Gln Leu Leu Gly Ile Trp Gly Cys Ser Gly Arg Leu
            595                 600                 605


Ile Cys Thr Thr Ala Val Pro Trp Asn Ser Ser Trp Ser Asn Lys Ser
    610                 615                 620
```

136

```
Glu Ala Asp Ile Trp Asp Asn Met Thr Trp Met Gln Trp Asp Arg Glu
625             630             635             640

Ile Asn Asn Tyr Thr Glu Thr Ile Phe Arg Leu Leu Glu Asp Ser Gln
                645             650             655

Asn Gln Gln Glu Lys Asn Glu Lys Asp Leu Leu Glu Leu Asp Lys Trp
            660             665             670

Asn Asn Leu Trp Asn Trp Phe Asp Ile Ser Asn Trp Leu Trp Tyr Ile
        675             680             685

Lys Ile Phe Ile Met Ile Val Gly Gly Leu Ile Gly Leu Arg Ile Ile
    690             695             700

Phe Ala Val Leu Ser Ile Val Asn Arg Val Arg Gln Gly Tyr Ser Pro
705             710             715             720

Leu Ser Phe Gln Thr Leu Thr Pro Ser Pro Arg Gly Leu Asp Arg Leu
            725             730             735

Gly Gly Ile Glu Glu Glu Gly Gly Glu Gln Asp Arg Asp Arg Ser Ile
            740             745             750

Arg Leu Val Ser Gly Phe Leu Ser Leu Ala Trp Asp Asp Leu Arg Ser
        755             760             765

Leu Cys Leu Phe Ser Tyr His Arg Leu Arg Asp Phe Ile Leu Ile Ala
    770             775             780

Val Arg Ala Val Glu Leu Leu Gly His Ser Ser Leu Arg Gly Leu Gln
785             790             795             800

Arg Gly Trp Glu Ile Leu Lys Tyr Leu Gly Ser Leu Val Gln Tyr Trp
            805             810             815

Gly Leu Glu Leu Lys Lys Ser Ala Ile Ser Pro Leu Asp Thr Ile Ala
            820             825             830

Ile Ala Val Ala Glu Gly Thr Asp Arg Ile Ile Glu Leu Val Gln Arg
            835             840             845

Ile Cys Arg Ala Ile Leu Asn Ile Pro Arg Arg Ile Arg Gln Gly Phe
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137

Glu Ala Ala Leu Leu
865

<210>   146
<211>   854
<212>   PRT
<213>   Human immunodeficiency virus TV2.12-5/1

<400>   146

Met Arg Ala Arg Gly Ile Leu Lys Asn Tyr Arg His Trp Trp Ile Trp
1   5   10   15

Gly Ile Leu Gly Phe Trp Met Leu Met Met Cys Asn Val Lys Gly Leu
                20   25   30

Trp Val Thr Val Tyr Tyr Gly Val Pro Val Gly Arg Glu Ala Lys Thr
            35   40   45

Thr Leu Phe Cys Ala Ser Asp Ala Lys Ala Tyr Glu Lys Glu Val His
        50   55   60

Asn Val Trp Ala Thr His Ala Cys Val Pro Thr Asp Pro Asn Pro Gln
65   70   75   80

Glu Val Ile Leu Gly Asn Val Thr Glu Asn Phe Asn Met Trp Lys Asn
                85   90   95

Asp Met Val Asp Gln Met Gln Glu Asp Ile Ile Ser Leu Trp Asp Gln
            100   105   110

Ser Leu Lys Pro Cys Val Lys Leu Thr Pro Leu Cys Val Thr Leu Asn
        115   120   125

Cys Thr Asn Ala Thr Val Asn Tyr Asn Asn Thr Ser Lys Asp Met Lys
    130   135   140

Asn Cys Ser Phe Tyr Val Thr Thr Glu Leu Arg Asp Lys Lys Lys Lys
145   150   155   160

Glu Asn Ala Leu Phe Tyr Arg Leu Asp Ile Val Pro Leu Asn Asn Arg
                165   170   175

138

```
Lys Asn Gly Asn Ile Asn Asn Tyr Arg Leu Ile Asn Cys Asn Thr Ser
        180                 185                 190

Ala Ile Thr Gln Ala Cys Pro Lys Val Ser Phe Asp Pro Ile Pro Ile
        195                 200                 205

His Tyr Cys Ala Pro Ala Gly Tyr Ala Pro Leu Lys Cys Asn Asn Lys
    210                 215                 220

Lys Phe Asn Gly Ile Gly Pro Cys Asp Asn Val Ser Thr Val Gln Cys
225                 230                 235                 240

Thr His Gly Ile Lys Pro Val Val Ser Thr Gln Leu Leu Leu Asn Gly
                245                 250                 255

Ser Leu Ala Glu Glu Glu Ile Ile Ile Arg Ser Glu Asn Leu Thr Asn
        260                 265                 270

Asn Val Lys Thr Ile Ile Val His Leu Asn Glu Ser Ile Glu Ile Lys
        275                 280                 285

Cys Thr Arg Pro Gly Asn Asn Thr Arg Lys Ser Val Arg Ile Gly Pro
    290                 295                 300

Gly Gln Ala Phe Tyr Ala Thr Gly Asp Ile Ile Gly Asp Ile Arg Gln
305                 310                 315                 320

Ala His Cys Asn Ile Ser Lys Asn Glu Trp Asn Thr Thr Leu Gln Arg
                325                 330                 335

Val Ser Gln Lys Leu Gln Glu Leu Phe Pro Asn Ser Thr Gly Ile Lys
                340                 345                 350

Phe Ala Pro His Ser Gly Gly Asp Leu Glu Ile Thr Thr His Ser Phe
        355                 360                 365

Asn Cys Gly Gly Glu Phe Phe Tyr Cys Asn Thr Thr Asp Leu Phe Asn
        370                 375                 380

Ser Thr Tyr Ser Asn Gly Thr Cys Thr Asn Gly Thr Cys Met Ser Asn
385                 390                 395                 400
```

139

```
Asn Thr Glu Arg Ile Thr Leu Gln Cys Arg Ile Lys Gln Ile Ile Asn
            405                     410                 415

Met Trp Gln Glu Val Gly Arg Ala Met Tyr Ala Pro Pro Ile Ala Gly
            420                     425                 430

Asn Ile Thr Cys Arg Ser Asn Ile Thr Gly Leu Leu Leu Thr Arg Asp
            435                     440                 445

Gly Gly Asp Asn Asn Thr Glu Thr Glu Thr Phe Arg Pro Gly Gly Gly
    450                     455                 460

Asp Met Arg Asp Asn Trp Arg Ser Glu Leu Tyr Lys Tyr Lys Val Val
465                     470                 475                 480

Glu Ile Lys Pro Leu Gly Val Ala Pro Thr Ala Ala Lys Arg Arg Val
                485                     490                 495

Val Glu Arg Glu Lys Arg Ala Val Gly Ile Gly Ala Val Phe Leu Gly
            500                     505                 510

Phe Leu Gly Ala Ala Gly Ser Thr Met Gly Ala Ala Ser Ile Thr Leu
            515                     520                 525

Thr Val Gln Ala Arg Gln Leu Leu Ser Gly Ile Val Gln Gln Gln Ser
    530                     535                 540

Asn Leu Leu Arg Ala Ile Glu Ala Gln Gln His Met Leu Gln Leu Thr
545                     550                 555                 560

Val Trp Gly Ile Lys Gln Leu Gln Ala Arg Val Leu Ala Ile Glu Arg
                565                     570                 575

Tyr Leu Gln Asp Gln Gln Leu Leu Gly Leu Trp Gly Cys Ser Gly Lys
            580                     585                 590

Leu Ile Cys Thr Thr Asn Val Leu Trp Asn Ser Ser Trp Ser Asn Lys
            595                     600                 605

Thr Gln Ser Asp Ile Trp Asp Asn Met Thr Trp Met Gln Trp Asp Arg
    610                     615                 620

Glu Ile Ser Asn Tyr Thr Asn Thr Ile Tyr Arg Leu Leu Glu Asp Ser
```

140

Gln Ser Gln Gln Glu Arg Asn Glu Lys Asp Leu Leu Ala Leu Asp Arg
            645   650   655

Trp Asn Asn Leu Trp Asn Trp Phe Ser Ile Thr Asn Trp Leu Trp Tyr
            660   665   670

Ile Lys Ile Phe Ile Met Ile Val Gly Gly Leu Ile Gly Leu Arg Ile
        675   680   685

Ile Phe Ala Val Leu Ser Leu Val Asn Arg Val Arg Gln Gly Tyr Ser
    690   695   700

Pro Leu Ser Leu Gln Thr Leu Ile Pro Asn Pro Arg Gly Pro Asp Arg
705   710   715   720

Leu Gly Gly Ile Glu Glu Glu Gly Gly Glu Gln Asp Ser Ser Arg Ser
            725   730   735

Ile Arg Leu Val Ser Gly Phe Leu Thr Leu Ala Trp Asp Asp Leu Arg
        740   745   750

Ser Leu Cys Leu Phe Cys Tyr His Arg Leu Arg Asp Phe Ile Leu Ile
        755   760   765

Val Val Arg Ala Val Glu Leu Leu Gly His Ser Ser Leu Arg Gly Leu
    770   775   780

Gln Arg Gly Trp Gly Thr Leu Lys Tyr Leu Gly Ser Leu Val Gln Tyr
785   790   795   800

Trp Gly Leu Glu Leu Lys Lys Ser Ala Ile Asn Leu Leu Asp Thr Ile
            805   810   815

Ala Ile Ala Val Ala Glu Gly Thr Asp Arg Ile Leu Glu Phe Ile Gln
            820   825   830

Asn Leu Cys Arg Gly Ile Arg Asn Val Pro Arg Arg Ile Arg Gln Gly
        835   840   845

Phe Glu Ala Ala Leu Gln
    850

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<211>   875
<212>   PRT
<213>   Artificial

<220>
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<223>   Xaa can be any naturally occurring amino acid

<400>   147
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Met Arg Val Met Gly Thr Gln Lys Asn Cys Gln Gln Trp Trp Ile Trp
1               5                   10                  15

Gly Ile Leu Gly Phe Trp Met Leu Met Ile Cys Asn Val Glu Asp Leu
            20              25                  30

Trp Val Thr Val Tyr Tyr Gly Val Pro Val Trp Arg Glu Ala Lys Thr
        35              40                  45

Thr Leu Phe Cys Ala Ser Asp Ala Lys Ala Tyr Glu Thr Glu Val His
    50              55                  60

Asn Val Trp Ala Thr His Ala Cys Val Pro Thr Asp Pro Asn Pro Gln
65              70              75                      80

Glu Ile Val Leu Gly Asn Val Thr Glu Asn Phe Asn Met Trp Lys Asn
            85                  90                  95

Asn Met Val Asp Gln Met His Glu Asp Ile Ile Ser Leu Trp Asp Gln
            100                 105                 110

Ser Leu Lys Pro Cys Val Lys Leu Thr Pro Leu Cys Val Thr Leu Asn
        115                 120                 125

Cys Thr Asn Thr Asn Val Thr Gly Asn Arg Thr Val Thr Gly Asn Ser
    130                 135                 140

Asn Ser Asn Xaa Xaa Ala Xaa Ala Xaa Tyr Xaa Xaa Glu Glu Met Lys
145             150             155                     160

Asn Cys Ser Phe Asn Val Thr Thr Glu Leu Arg Asp Lys Lys His Lys
            165                 170                 175

Glu Tyr Ala Leu Phe Tyr Lys Leu Asp Ile Val Pro Leu Asn Asn Xaa
            180                 185                 190

Glu Asn Ser Asn Asn Phe Thr Tyr Arg Leu Ile Asn Cys Asn Thr Ser
        195                 200                 205

Thr Ile Thr Gln Ala Cys Pro Lys Val Ser Phe Asp Pro Ile Pro Ile
    210                 215                 220
```

His Tyr Cys Ala Pro Ala Gly Tyr Ala Ile Leu Lys Cys Asn Asn Lys
225   230   235   240

Thr Phe Asn Gly Thr Gly Pro Cys Tyr Asn Val Ser Thr Val Gln Cys
            245   250   255

Thr His Gly Ile Lys Pro Val Val Ser Thr Gln Leu Leu Leu Asn Gly
            260   265   270

Ser Leu Ala Glu Glu Gly Ile Ile Ile Arg Ser Glu Asn Leu Thr Glu
            275   280   285

Asn Thr Lys Thr Ile Ile Val His Leu Asn Glu Ser Val Glu Ile Asn
    290   295   300

Cys Thr Arg Pro Asn Asn Asn Thr Arg Lys Ser Val Arg Ile Gly Pro
305   310   315   320

Gly Gln Ala Phe Tyr Ala Thr Asn Asp Ile Ile Gly Asn Ile Arg Gln
            325   330   335

Ala His Cys Asn Ile Ser Thr Asp Arg Trp Asn Lys Thr Leu Gln Gln
            340   345   350

Val Met Lys Lys Leu Gln Glu His Phe Pro Asn Lys Thr Xaa Ile Lys
            355   360   365

Phe Lys Pro His Ala Gly Gly Asp Leu Glu Ile Thr Met His Ser Phe
    370   375   380

Asn Cys Arg Gly Glu Phe Phe Tyr Cys Asn Thr Ser Asn Leu Phe Asn
385   390   395   400

Ser Thr Tyr His Asn Xaa Xaa Xaa Xaa Asn Gly Thr Tyr Lys Tyr Asn
            405   410   415

Gly Asn Ser Ser Xaa Pro Ile Thr Leu Gln Cys Lys Ile Lys Gln Ile
            420   425   430

Ile Arg Met Trp Gln Gly Val Gly Gln Ala Met Tyr Ala Pro Pro Ile
            435   440   445

Ala Gly Asn Ile Thr Cys Arg Ser Asn Ile Thr Gly Ile Leu Leu Thr

144

Arg Asp Gly Gly Phe Asn Asn Thr Asn Thr Xaa Xaa Thr Glu Thr Phe
465   470   475   480

Arg Pro Gly Gly Gly Asp Met Arg Asp Asn Trp Arg Ser Glu Leu Tyr
                485   490   495

Lys Tyr Lys Val Val Glu Ile Lys Pro Leu Gly Ile Ala Pro Thr Lys
            500   505   510

Ala Lys Arg Arg Val Val Gln Arg Glu Lys Arg Ala Val Gly Ile Gly
            515   520   525

Ala Val Phe Leu Gly Phe Leu Gly Ala Ala Gly Ser Thr Met Gly Ala
            530   535   540

Ala Ser Ile Thr Leu Thr Val Gln Ala Arg Gln Leu Leu Ser Gly Ile
545   550   555   560

Val Gln Gln Gln Ser Asn Leu Leu Lys Ala Ile Glu Ala Gln Gln His
                565   570   575

Met Leu Gln Leu Thr Val Trp Gly Ile Lys Gln Leu Gln Ala Arg Val
            580   585   590

Leu Ala Ile Glu Arg Tyr Leu Lys Asp Gln Gln Leu Leu Gly Ile Trp
            595   600   605

Gly Cys Ser Gly Lys Leu Ile Cys Thr Thr Ala Val Pro Trp Asn Ser
    610   615   620

Ser Trp Ser Asn Lys Ser Glu Ala Asp Ile Trp Asp Asn Met Thr Trp
625   630   635   640

Met Gln Trp Asp Arg Glu Ile Ser Asn Tyr Thr Asn Thr Ile Tyr Arg
                645   650   655

Leu Leu Glu Asp Ser Gln Asn Gln Gln Glu Lys Asn Glu Lys Asp Leu
            660   665   670

Leu Glu Leu Asp Lys Trp Asn Asn Leu Trp Asn Trp Phe Asp Ile Ser
            675   680   685

145

```
Asn Trp Leu Trp Tyr Ile Lys Ile Phe Ile Met Ile Val Gly Gly Leu
    690                 695             700

Ile Gly Leu Arg Ile Ile Phe Ala Val Leu Ser Ile Val Asn Arg Val
705             710             715                 720

Arg Gln Gly Tyr Ser Pro Leu Ser Phe Gln Thr Leu Thr Pro Ser Pro
                725             730                 735

Arg Gly Pro Asp Arg Leu Gly Gly Ile Glu Glu Glu Gly Gly Glu Gln
            740             745             750

Asp Arg Asp Arg Ser Ile Arg Leu Val Ser Gly Phe Leu Ser Leu Ala
        755             760             765

Trp Asp Asp Leu Arg Ser Leu Cys Leu Phe Ser Tyr His Arg Leu Arg
    770             775             780

Asp Phe Ile Leu Ile Ala Val Arg Ala Val Glu Leu Leu Gly His Ser
785             790             795                 800

Ser Leu Arg Gly Leu Gln Arg Gly Trp Glu Ile Leu Lys Tyr Leu Gly
            805             810                 815

Ser Leu Val Gln Tyr Trp Gly Leu Glu Leu Lys Lys Ser Ala Ile Ser
            820             825                 830

Leu Leu Asp Thr Ile Ala Ile Ala Val Ala Glu Gly Thr Asp Arg Ile
        835             840             845

Ile Glu Leu Val Gln Arg Ile Cys Arg Ala Ile Leu Asn Ile Pro Arg
    850             855             860

Arg Ile Arg Gln Gly Phe Glu Ala Ala Leu Leu
865             870             875
```